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FLOOD PLAIN INFORMATION REPORT, BLACK RIVER, NEW YORK, DEFERIET--ETC(U)
1977

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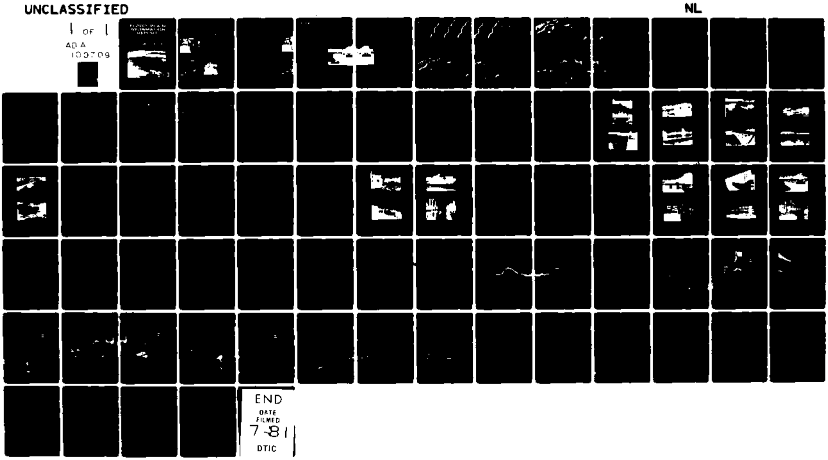

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FLOOD PLAIN INFORMATION REPORT

(12)

BLACK RIVER NEW YORK

LEVEL II

DEFERIET DAM TO CONFLUENCE DEER RIVER.

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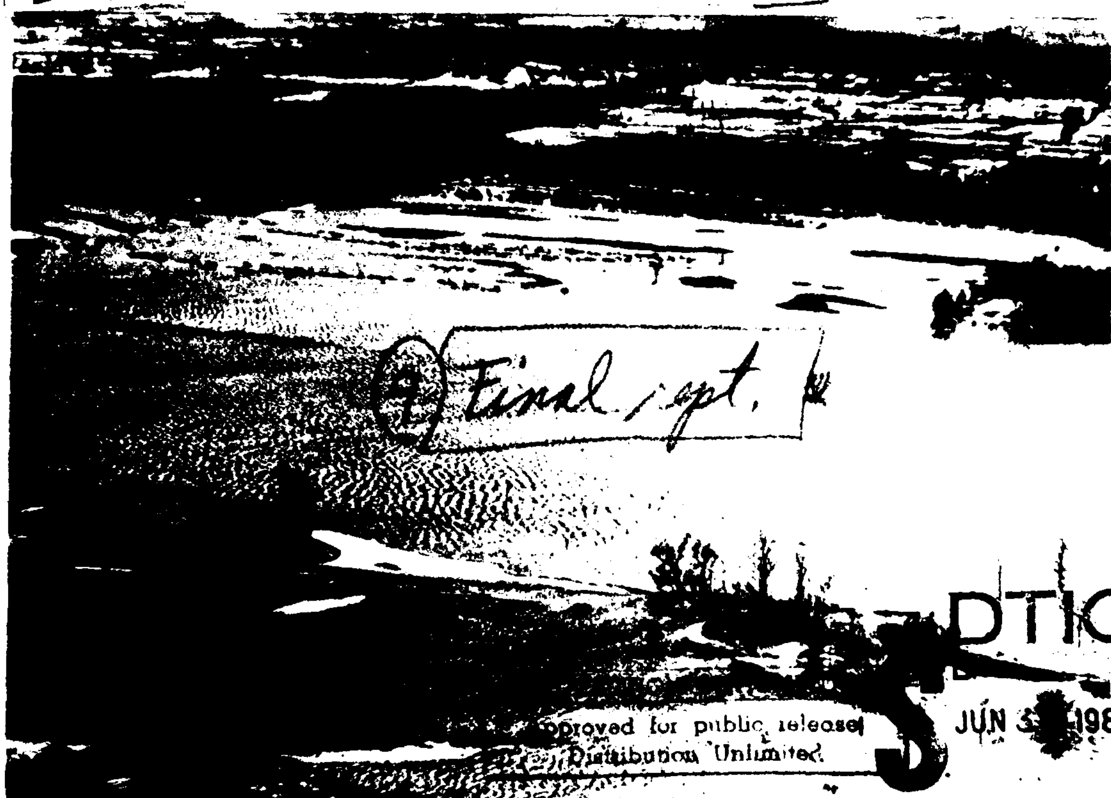

Final rept.

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PREPARED THROUGH THE COORDINATION OF THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION BY THE DEPARTMENT OF THE ARMY, BUFFALO DISTRICT, CORPS OF ENGINEERS, BUFFALO, NEW YORK.

NOVEMBER 1977

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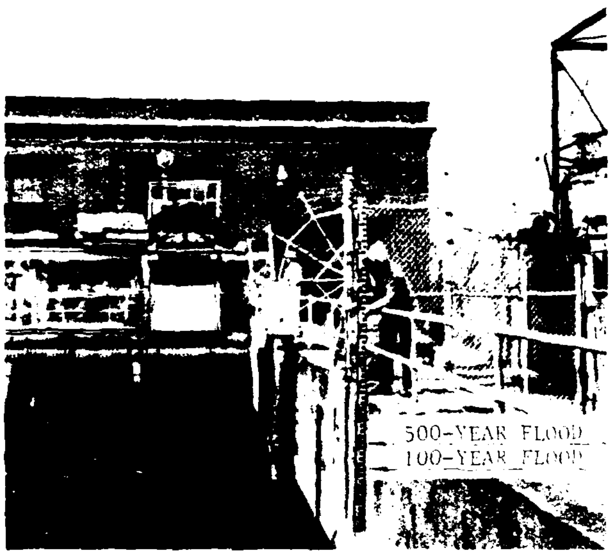
FLOODS

BLACK RIVER
NEW YORK
DEFERIET DAM TO
CONFLUENCE DEER RIVER

November 1977



Possible future flood heights at Herring Dam at stream mile 32.2.

ACTION IS NEEDED

Fortunately, the Black River flood plain through Carthage and West Carthage is only sparsely developed. Since both communities have flood plain regulations, it is imperative that they are enforced.

The entire flood plain does not have to be kept only for open space uses. Portions of the flood plain can be used for residential development, but precautions against possible future flooding must be taken first. Under natural conditions, flood waters in excess of channel capacity spread out over the valley land. All encroachments onto the flood plain should be carefully studied to assess their impact upon existing flood plain conditions and future flood stages. In addition to establishing zoning ordinances, subdivision regulations, and building codes, local government also can police and maintain floodway so as to insure against the overgrowth of brush, weeds, and the collection of debris which obstruct flood flows.

Possible future flood hei
at stream mi

This folder was prepared through coordination of the New York State Department of Environmental Conservation by the Buffalo District, Corps of Engineers. Copies of the formal report and this folder will be distributed through the New York State Department of Environmental Conservation, Division of Water Resources, 317 Washington St., Watertown, N.Y. 13601.

FLOODS

On
Black River, N. Y.
Deferiet Dam to Confluence Deer River

This folder is a brief summary of the information contained in the "Flood Plain Information Report for Black River, New York, Deferiet Dam to Confluence Deer River." The study covers 11 miles of Black River in Jefferson and Lewis Counties. The villages of Carthage and West Carthage are included in the study area. Most of the study area is agricultural, industrial, or residential.

The report was prepared at the request of the Black River Basin Regional Water Resources Planning Board and through the cooperation of the New York State Department of Environmental Conservation, Albany, New York 12201. The purpose of the report is to present the facts on potential flood hazards on the Black River which will provide a sound basis for land use planning and for management decisions concerning flood plain utilization.

Although there was a major flood on the Black River in March 1977, studies indicate that even larger floods can occur in the future. Emphasis is given to future floods in the FPI report. Flood outline maps, water surface profiles, and valley cross sections have been included to illustrate the possible extent and severity of future floods.

This folder includes photographs which show possible future flood heights in the study area. The flood height shown for a large flood, the 100-Year Flood, has a chance of being equaled or exceeded once in 100 years on the average although it could occur in any year. Also indicated is the flood height that would be reached if a very large flood, the 500-Year Flood, should occur.

POSSIBLE FUTURE FLOOD HEIGHTS
Elevation (U.S.C. and G.S. Datum) Feet

Location	Stream Mile	Large Fl (100 Ye
Upstream Deferiet Dam	26.53	663.
Upstream Herring Dam	28.16	686
Upstream Abandoned Railroad Bridge	30.06	687
Upstream Conrail Bridge	32.19	733.

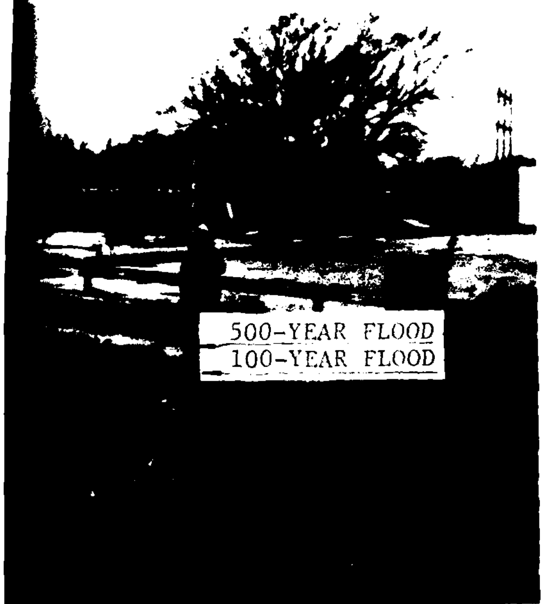
Inside are sketches which illustrate the horizontal and vertical relation a flooded area map from the formal report which shows the extent of b floods.

Possible future flood heights at
a parking lot in Carthage at stream mile 32.2.

URE FLOOD HEIGHTS
C. and G.S. Datum) Feet

Stream Mile	Large Flood (100 Year)	Very Large Flood (500 Year)
26.53	663.1	664.0
28.16	686.3	687.2
30.06	687.0	688.6
32.19	733.4	734.4

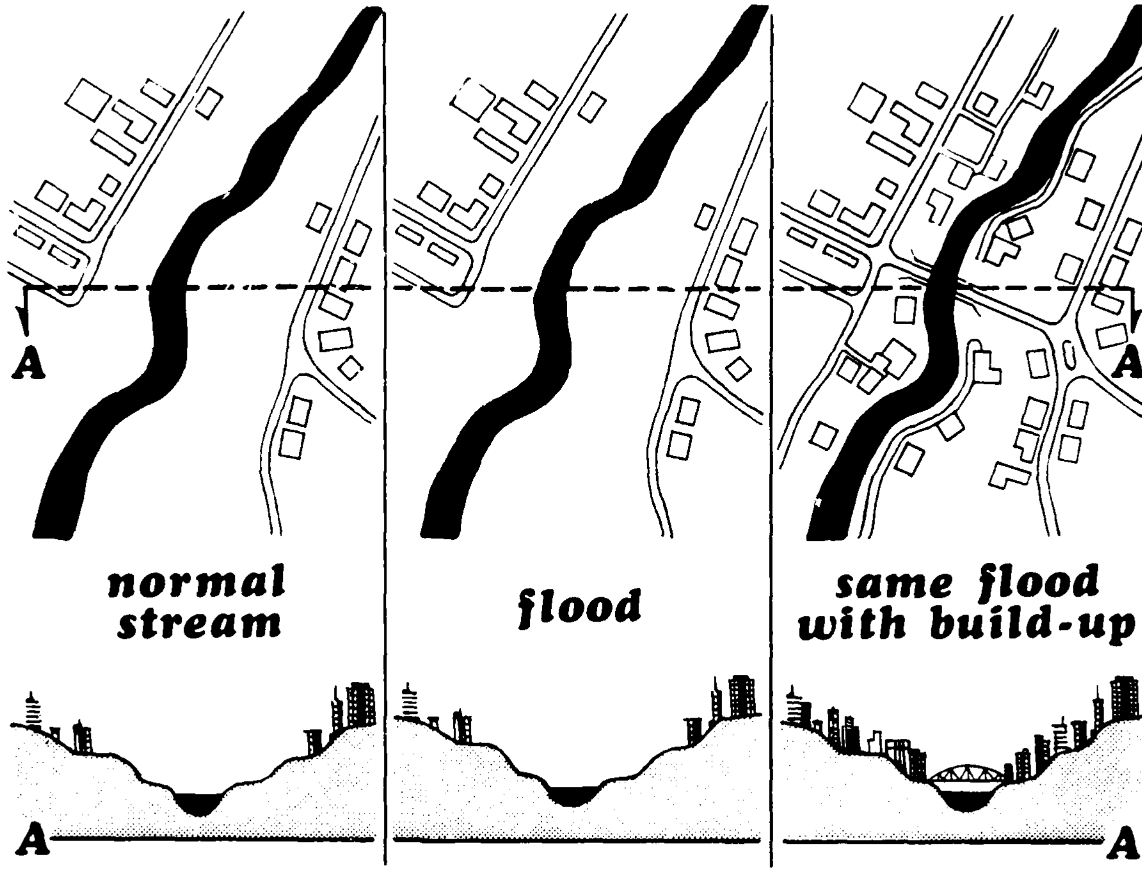
rizontal and vertical relationships of flooded areas and which shows the extent of both the 100- and 500-year



future flood heights at
Carthage at stream mile 32.2.

2

BUILDING in the FLOOD PLAIN can make FLOODS WIDER and DEEPER



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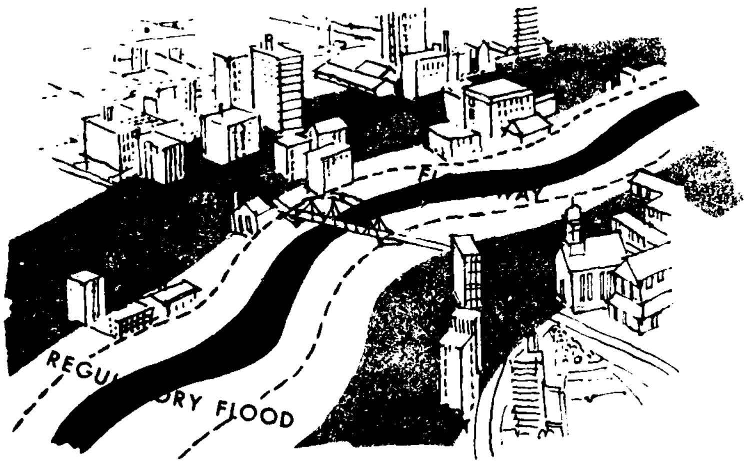
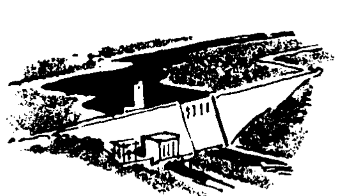


MEASURES TO REDUCE *VULNERABILITY TO FLOODS* *provide for a future with more freedom from flood damage, often at minor cost and with little adverse effect on the environment • • • • • •*

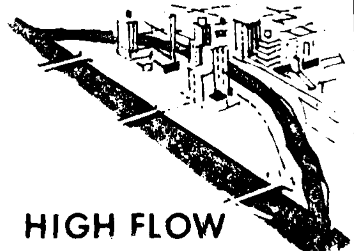
REGULATIONS
(ZONING, BUILDING CODES, SUBDIVISION)
• FLOOD PROOFING • RELOCATIONS •
• URBAN RENEWAL •

MEASURES TO MODIFY FLOODS
are often required to alleviate existing problems and sometimes to forestall future problems • • •

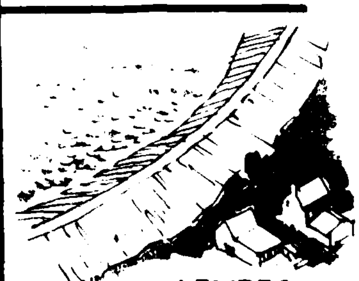


DAMS & RESERVOIRS

CHANNEL ENLARGEMENT



HIGH FLOW DIVERSION



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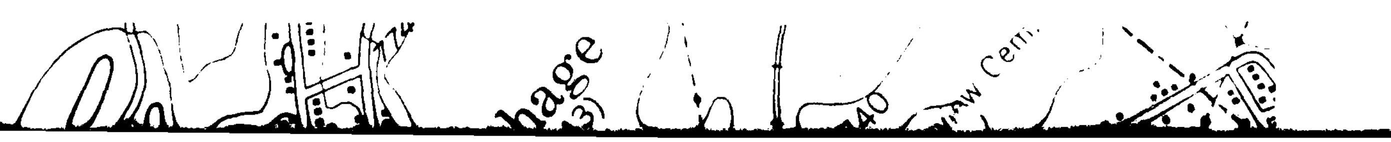

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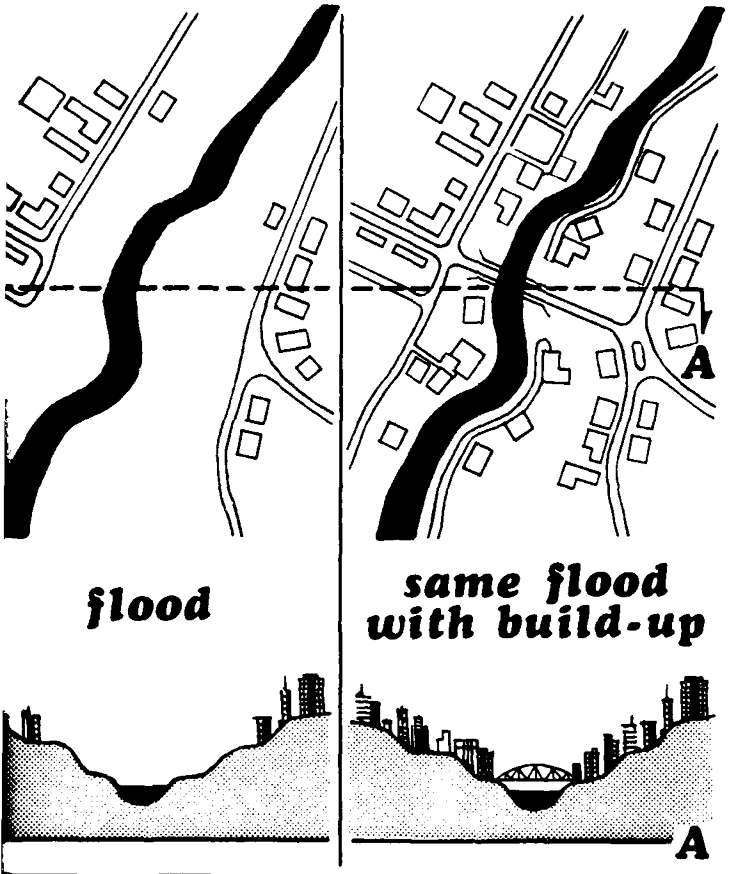


flood

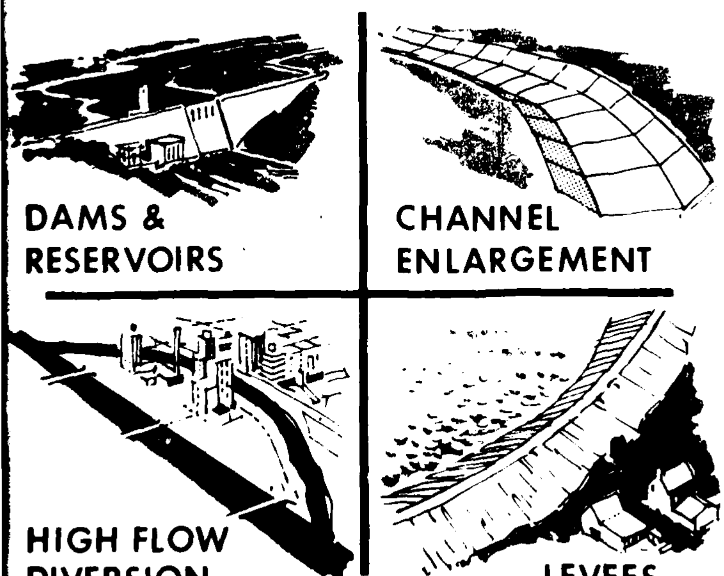
same flood with build-up

this ENCROACHMENT can change a Small Flood into a MAJOR FLOOD

NT for the reduction of Flood Damage and Human Suffering

MEASURES TO MODIFY FLOODS

are often required to alleviate existing problems and sometimes to forestall future problems . . .



DAMS & RESERVOIRS

CHANNEL ENLARGEMENT

HIGH FLOW DIVERSION

LEVEES

OTHER MEASURES

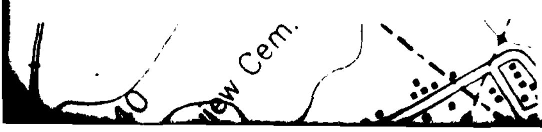
aid the Flood Plain occupant in coping with floods . . .

EDUCATION

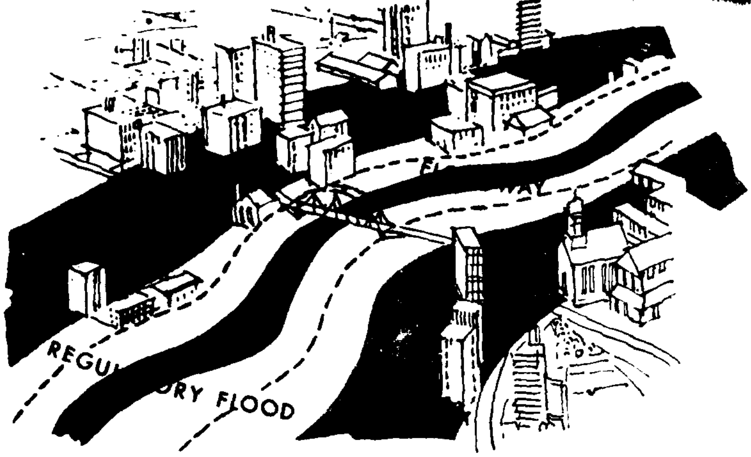
TAX ADJUSTMENTS

FLOOD INSURANCE

WARNING & EMERGENCY PLANS



FLOOD PATTERNS



MEASURES TO REDUCE *VULNERABILITY TO FLOODS provide for a future with more freedom from flood damage, often at minor cost and with little adverse effect on the environment . . . . . .*

REGULATIONS

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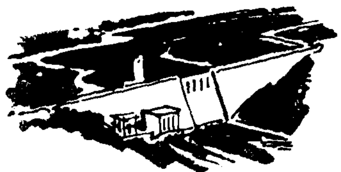
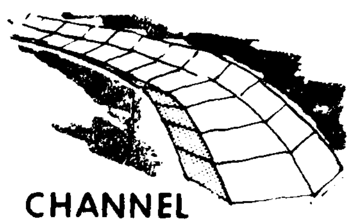
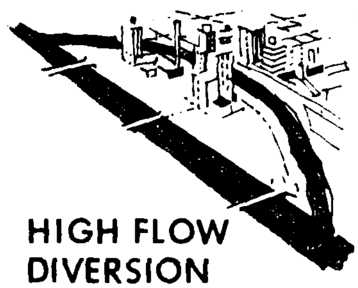


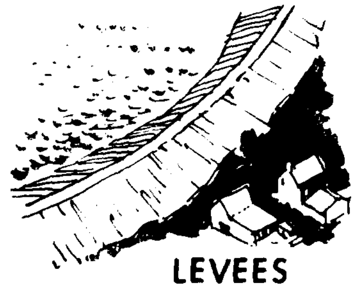
DAMS & RESERVOIRS



CHANNEL ENLARGEMENT



HIGH FLOW DIVERSION



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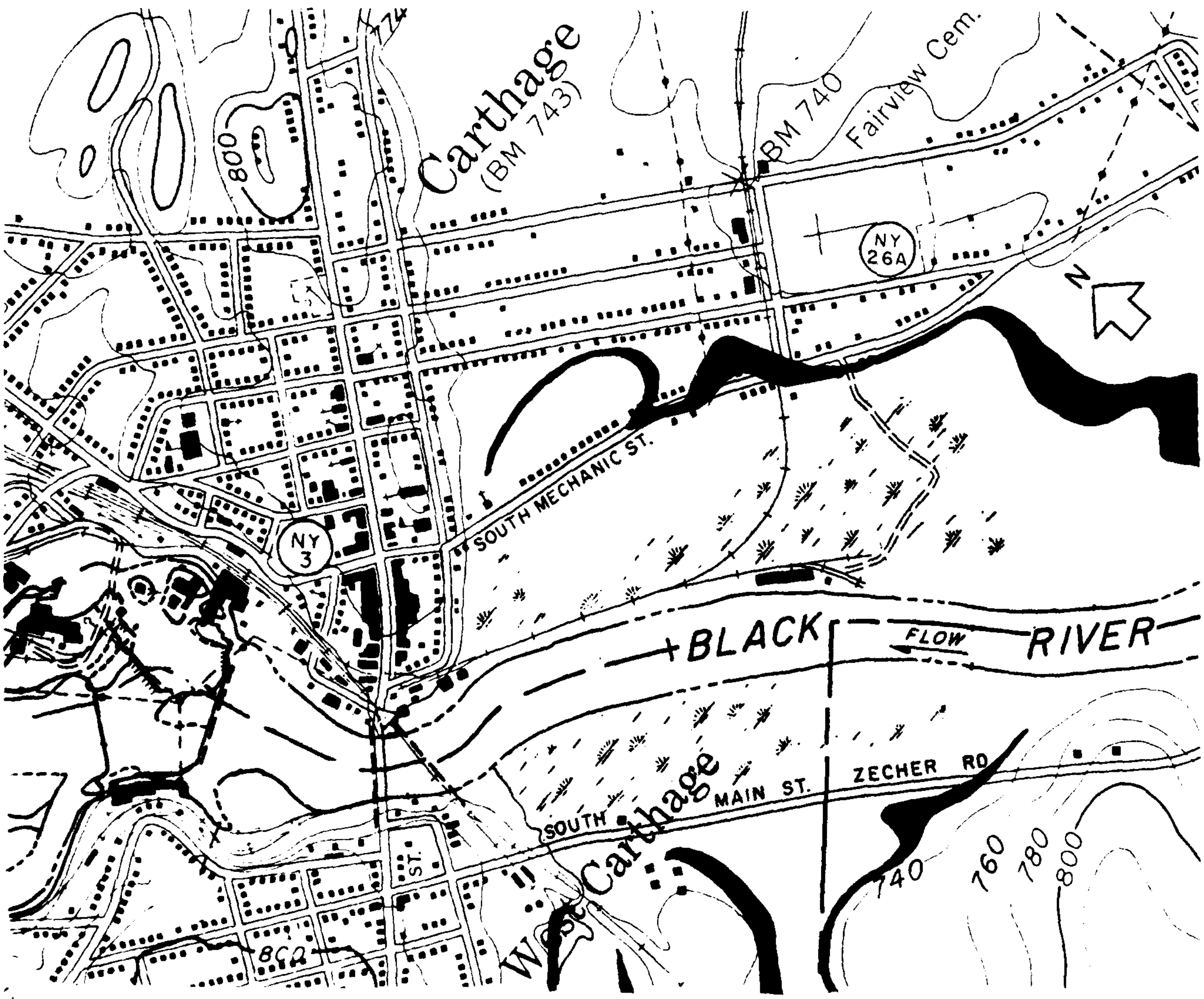

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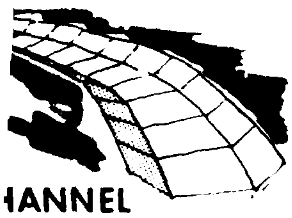

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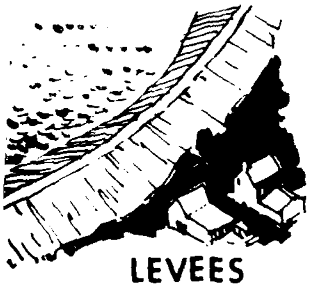

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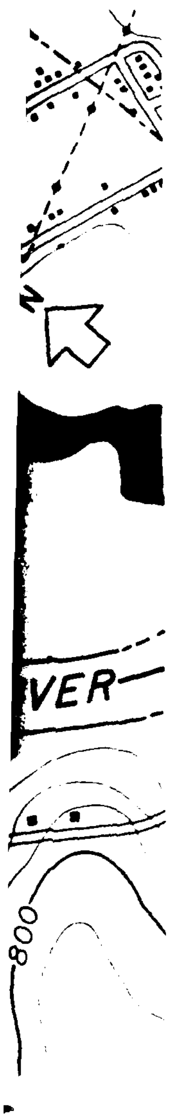

FLOOD PATTERNS

BLACK RIVER, NEW YORK
DEFERIET DAM TO
CONFLUENCE DEER RIVER

LEGEND

approximate limits of overflow

NORMAL STREAM

100 YEAR FLOOD

500 YEAR FLOOD

PROFILES in the *Flood Plain Information Report* show elevations of these floods for the entire study area

SECURITY CLASSIFICATION OF THIS PAGE (*When Data Entered*)

REPORT DOCUMENTATION PAGE

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1. REPORT NUMBER	2. GOVT ACCESSION NO. AD-A100 909	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (*and Subtitle*) Flood Plain Information Report Black River, N.Y. Deferiet Dam to Confluence Deer River		5. TYPE OF REPORT & PERIOD COVERED Final
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s)		8. CONTRACT OR GRANT NUMBER(s)
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18. SUPPLEMENTARY NOTES

19. KEY WORDS (*Continue on reverse side if necessary and identify by block number*)

Floods
Flooding
Black River

20. ABSTRACT (*Continue on reverse side if necessary and identify by block number*)

This flood plain information report relates to the flood situation in the Black River Basin in Lewis and Jefferson Counties. The study area includes the Villsges of Carthage and West Cartage and the townships of Wilna Champion, Croghan, and Denmark. This report has been prepared because a knowledge of potential floods and flood hazards is important in land use planning. It includes a histroy of flooding along the Black River and identifies those areas that are subject to possible future floods. Special emphasis is given to these floods through maps, photographs, water surface profiles, and cross sections.

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TABLE OF CONTENTS

Subject	Page
PREFACE	iv
BACKGROUND INFORMATION	1
Settlement	1
The Stream and Its Valley	2
SOURCES OF DATA	3
Data Sources and Records	3
FLOOD SITUATION	4
Flood Season and Flood Characteristics	4
FLOOD FACTORS	5
Morphologic-Hydraulic Conditions	5
Obstructions to Flows	6
UNIFIED FLOOD PLAIN MANAGEMENT PROGRAMS	12
Flood Plain Regulations	12
Development Zones	13
Formulation of Flood Plain Regulations	13
National Flood Insurance Program	14
OTHER FACTORS AND THEIR IMPACT ON FLOODING	14
Flood Warning and Forecasting	14
Flood Fighting and Emergency Evacuation Plans	14
Material Storage on the Flood Plain	15
PAST FLOODS	15
Flood Descriptions	15
April 1869 Flood	15
April 1928 Flood	15
April 1963 Flood	15
March 1977 Flood	16
FUTURE FLOODS	19
Flood Magnitudes and Their Frequencies	19
Hazards and Damages of Large Floods	19
Flooded Areas	20
Obstructions	20
Velocities of Flow	21
Rates of Rise and Duration of Flooding	21
Photographs, Future Flood Heights	21
GLOSSARY	31

TABLE OF CONTENTS (Continued)

FIGURES

Figure	Subject	Page
1	Crest of Deferiet Dam at Stream Mile 26.53	7
2	Crest of Herring Dam at Stream Mile 28.16	7
3	Abandoned Railroad Bridge at Stream Mile 30.06	8
4	Low Dam at Stream Mile 31.82	8
5	Carthage State Dam at Stream Mile 31.92	9
6	State Route 26 Bridge at Stream Mile 32.14	9
7	Pasture at Stream Mile 35.90	10
8	Mouth of Deer River at Stream Mile 37.22	10
9	Debris at Gated Structure at Stream Mile 26.53	11
10	Debris Near Bridge at Stream Mile 31.82	11
11-14	Flooding Conditions in March 1977	17-18
15-20	Future Flood Heights	22-24
Cover photo	Flooding conditions in March 1977 in "flats" area upstream of Carthage.	

TABLES

Table		Page
1	Population Trends	1
2	Drainage Areas on Black River	3
3	USGS Stream Gaging Stations in Black River Basin	4
4	Peak Discharges on Black River at Watertown, NY	5
5	Peak Flows on Black River for Various Recurrence Intervals	25
6	Elevation Reference Marks in the Study Area	26
7	Bridge Data in the Study Area	28
8	Dam Data in the Study Area	29
9	100- and 500-Year Discharges and Average Velocities	30

TABLE OF CONTENTS (Continued)

PLATES

Plate		Follows Page
1	General Map	iv
2	Index Map - Flooded Areas	32
3-6	Flooded Areas	32
7-8	Flood Profiles	32
9-11	Valley Cross Sections	32

PREFACE

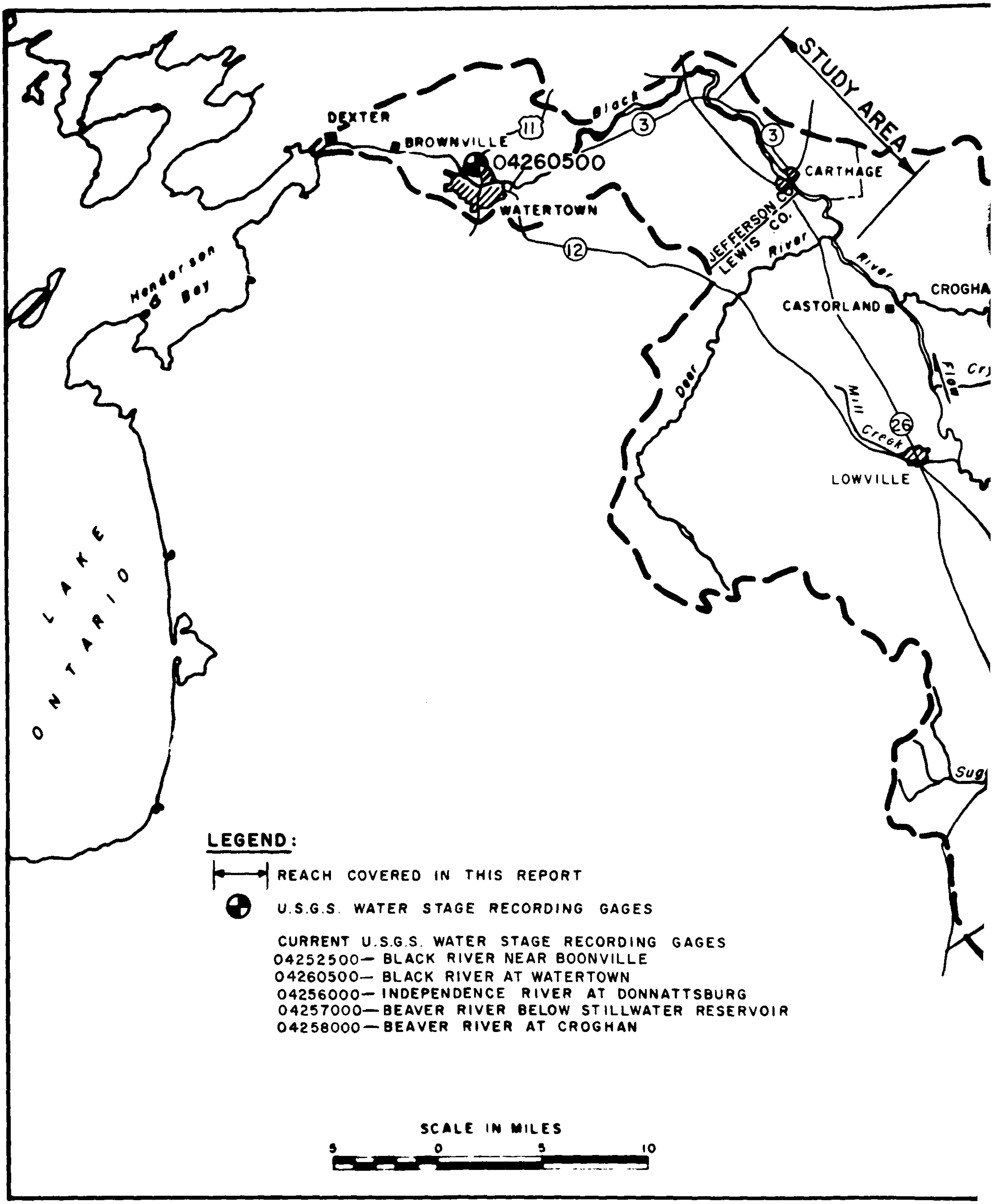
This flood plain information report relates to the flood situation in the Black River basin in Lewis and Jefferson Counties. The study area includes the villages of Carthage and West Carthage and the townships of Wilna, Champion, Croghan, and Denmark. Most of the area along the stream is agricultural or residential. Although large floods have occurred, studies indicate that even larger floods are possible.

This report has been prepared because a knowledge of potential floods and flood hazards is important in land use planning. It includes a history of flooding along the Black River and identifies those areas that are subject to possible future floods. Special emphasis is given to these floods through maps, photographs, water surface profiles, and cross sections. The report does not provide solutions to flood problems. However, it does furnish a suitable basis for the adoption of land use controls to guide flood plain development and thereby prevents intensification of the loss problem. It will also aid in the development of other flood damage reduction techniques such as works to modify flooding and other adjustments, including flood proofing, which might be embodied in an overall Flood Plain Management (FPM) program. Other FPM program studies, those of environmental attributes and the current and future land use role of the flood plain as part of its surroundings, would also profit from this information.

The report was prepared at the request of the Black River Basin Regional Water Resources Planning Board.

The assistance and cooperation of Mr. Ken Mayhew of the Hudson River-Black River Regulation District, the Carthage Republican-Tribune, Niagara Mohawk Power Corporation, and private citizens in supplying useful data and photographs for the preparation of this report are appreciated.

Additional copies of this report can be obtained from the New York State Department of Environmental Conservation. The Buffalo District Corps of Engineers will provide technical assistance and guidance to planning agencies in the interpretation and use of the data.


STUDY AREA
DEXTER
BROWNVILLE
04260500
CARTHAGE
WATERTOWN
Black
3
11
12
26
JEFFERSON CO.
LEWIS CO.
River
CROGHA
CASTORLAND
Henderson
Bay
Deer
Mill Creek
LOWVILLE
LAKE ONTARIO
LEGEND:
REACH COVERED IN THIS REPORT
U.S.G.S. WATER STAGE RECORDING GAGES
CURRENT U.S.G.S. WATER STAGE RECORDING GAGES
04252500— BLACK RIVER NEAR BOONVILLE
04260500— BLACK RIVER AT WATERTOWN
04256000— INDEPENDENCE RIVER AT DONNATTSBURG
04257000— BEAVER RIVER BELOW STILLWATER RESERVOIR
04258000— BEAVER RIVER AT CROGHAN
SCALE IN MILES
5
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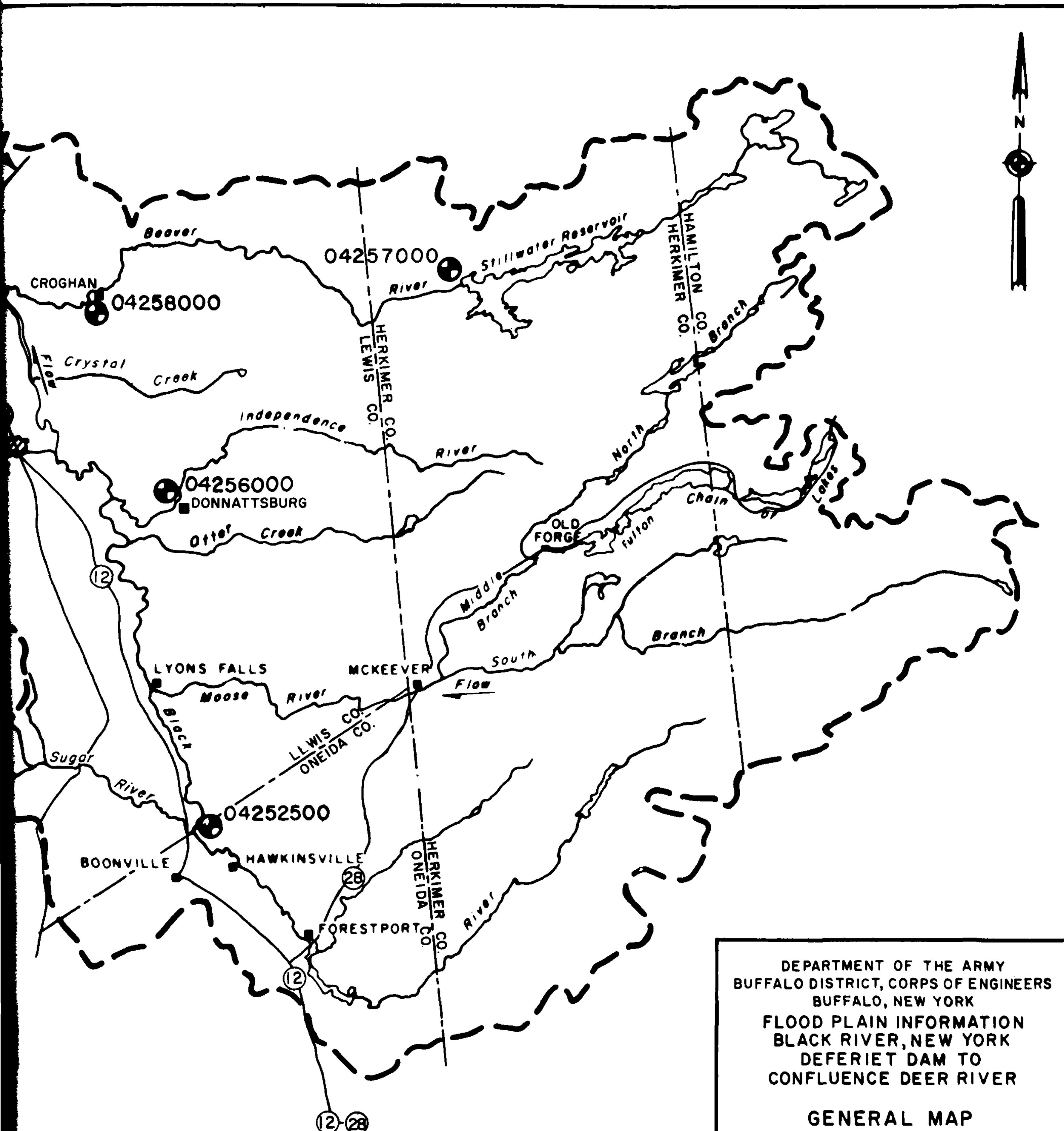


DEPARTMENT OF THE ARMY
BUFFALO DISTRICT, CORPS OF ENGINEERS
BUFFALO, NEW YORK

FLOOD PLAIN INFORMATION
BLACK RIVER, NEW YORK
DEFERIET DAM TO
CONFLUENCE DEER RIVER

GENERAL MAP

NOVEMBER 1977

PLATE I

BACKGROUND INFORMATION

This report covers flooding conditions along the Black River from Deferiet Dam, stream mile 26.53, to the confluence of Deer River in Croghan Township, stream mile 37.22. The portion of the Black River included in this report is shown on the general map, Plate 1.

Settlement

The area has been slowly developing and remains basically a rural and farming area. Table 1 shows the population trends for political subdivisions in the study area.

Table 1 - Population Trends

Political Subdivision	Population				
	1930	1940	1950	1960	1970
Jefferson County	83,574	84,003	85,521	87,835	88,508
Wilna, Township	7,322	7,029	6,969	6,809	6,538
Champion, Township	3,001	3,103	3,499	3,878	4,371
Carthage, Village	4,460	4,207	4,420	4,216	3,889
Lewis County	23,447	22,815	22,521	23,249	23,644
Croghan, Township	2,392	2,557	2,544	2,697	2,559
Denmark, Township	1,987	1,992	2,154	2,214	2,359

Settlement in the area began about 1798, and the town of Champion was born in 1800. West Carthage soon followed. Though the French were the first settlers to arrive, the New Englanders were the real pioneers. The Black River valley was a blanket of virgin forest but was cleared by the New Englanders. In 1802, the first saw mill was established in the town of Champion. In 1805, the village of Carthage celebrated its first birth. Carthage had tremendous resources, water and hydraulic power and favorable geographic location in relationship to the railroads. Carthage and West Carthage are separate incorporated villages. West Carthage, in the town of Champion, was incorporated on 18 March 1869. The town of Wilna encompasses the villages of Carthage, Herring, and Deferiet. In 1899, the pulp and interrelated industries were springing up. The National Paper Products Company, a division of Crown Zellerbach Corporation, came to Carthage in 1915.

Carthage is located on the Black River about 17 miles east of Watertown and 80 miles north of Syracuse. It is only a short distance from the Adirondack State Park to the east, the Thousand Islands and the St. Lawrence River to the north and Lake Ontario to the west. Today Carthage is an industrial, agricultural, and recreational community.

The stable economy of Carthage is based on its diversified industry. Besides its nationally famous dairy farming, Carthage is noted for papermaking, wooden specialty products, paper folding boxes, granite and memorial monuments, and industrial chemicals. Carthage, centrally located in northern New York on State Routes 3 and 26, is a trading center for a wide area embracing eastern Jefferson, northern Lewis and southwestern St. Lawrence Counties. Fishing, boating, swimming, hunting, camping and picnicking are some of the recreational activities.

The Stream and Its Valley

The Black River basin lies in the Lake Ontario drainage basin in northern New York in Hamilton, Herkimer, Oneida, Lewis, and Jefferson Counties and drains the western slopes of the Adirondack Plateau. The Black River rises in the eastern-central portion of Herkimer County, flows southwesterly 20 miles to Forestport, then northwesterly for about 65 miles to Carthage. The river then flows westerly through the city of Watertown and enters Black River Bay at the northeastern end of Lake Ontario. The Black River basin has a total drainage area of 1,916 square miles. The upper portion of the Black River basin is rugged and mountainous, contains many lakes, and is in Adirondack Park. The average topographic elevation of the upper basin is about 1,700 feet with some peaks rising to 3,500 feet. Between Lyons Falls and Carthage, the river meanders through a broad flat valley, which varies from 1/2 to two miles wide and falls about nine feet in 41 miles. This area commonly referred to as the "Flats" is subject to frequent flood damage because the stream banks are generally only about two feet above the low flow elevation of the river. Agricultural flood damage in these flat areas is a frequent occurrence. Between Carthage and Lake Ontario, the Black River flows through a rocky gorge and falls 480 feet in 30 miles. In this reach, rapids are common; and electrical power is developed at several locations. The Black River basin is shown on Plate 1. Black River was named after the color of its water. Moose River, which enters Black River upstream of Lyons Falls, is Black River's largest tributary. The Moose River watershed drains approximately 432 square miles in the southeastern section of the Black River basin. Other tributaries of the Black River are the Beaver River, Independence River, Otter Creek, and Deer River.

Drainage areas contributing to runoff at several locations on the Black River are shown in Table 2.

Table 2 - Drainage Areas on Black River

Location	Drainage Area (Square Miles) accumulated
Mouth	1916
U.S.G.S. gaging station at Watertown	1876
Deferiet Dam (downstream limit of study)	1818
Carthage State Dam	1806
Downstream of Deer River (upstream limit of study)	1772
Upstream of Deer River	1671
Downstream of Beaver River	1626
Upstream of Beaver River	1291
Downstream of Moose River	871
Upstream of Moose River	439

SOURCES OF DATA

Data Sources and Records

Newspaper files, historical documents, and stream flow records were searched for information concerning past floods. From these investigations there were significant findings about past floods.

Presently there are five active U.S. Geological Survey stream gaging stations in the Black River basin. These stations are listed in Table 3. Their locations are shown on Plate 1. Since April 1975, the Hudson River-Black River Regulation District has maintained a water-level recording gage on the Black River at the Conrail bridge in Carthage.

Table 3 - USGS Stream Gaging Stations in Black River Basin

Stream	Station Number	Location	Period of Record Through 1977 (years)	Drainage Area (sq. mi.)
Black River	04260500	Watertown	57	1876
Black River	04252500	nr. Boonville	66	295
Beaver River	04258000	Croghan	47	294
Beaver River	04257000	below Stillwater Reservoir Dam	69	172
Independence River	04256000	Donnattsburg	35	91.7

FLOOD SITUATION

Flood Season and Flood Characteristics

Floods occur in the Black River basin almost every year. Spring floods are usually caused by moderate amounts of rainfall and a melting snowpack in the heavily-wooded headwater regions. This snowpack has built up over the winter. Less frequent flooding occurs from summer storms. The largest flood of record on the Black River at the Watertown gage occurred on 15 March 1977. Its estimated peak discharge was 39,200 cfs. G.W. Rafter reports in New York State Museum Bulletin 85: "Heavy floods occurred on the Black River in 1807, 1833, 1850, 1862, 1866, 1869, and 1896." The eight highest recorded peak discharges on Black River at Watertown, in order of magnitude, are shown in Table 4. Estimated peak discharges in 1901 and 1913 are 37,000 cfs and 32,500 cfs, respectively.

Table 4 - Peak Discharges on Black River at Watertown, NY

Year	Date	Discharge (cfs)
1977	March 15	39,200
1963	April 5	36,700
1928	April 9	33,900
1969	May 22	33,600
1948	March 24	33,400
1947	April 13	32,200
1926	April 26	31,900
1972	May 5	30,900

FLOOD FACTORS

Morphologic-Hydraulic Conditions

The climate of the Black River basin is characterized by long cold winters and short, cool summers. Average snowfall in the lower "Flats" areas reaches up to 120 inches. In the upper mountainous areas, average snowfall reaches nearly 200 inches. During the spring thaw, floods occur almost every year. They are often caused by rainfall and snow melt.

The Black River has two stages of high water in the spring. The first flood occurs when the early spring thaw dissolves the snow on the lowlands and the cleared fields in the valley. The second flood comes approximately two to three weeks later when still warmer weather melts the deep snow on the higher wooded ranges of the Adirondacks in the upper part of the basin.

In the lower main valley the annual rainfall is about 40 inches. The worst storms of the area are those which result from the stalling of a northeastward moving low pressure area, by an encroachment of the sub-permanent North Atlantic high pressure area, and by a mass of cold polar air from the northwest. These storms have a duration of 1-1/2 to six days.

Under natural conditions, flood waters in excess of channel capacity spread out over the valley land. All encroachments onto the flood plain should be carefully studied to assess their impact upon existing flood plain conditions and future flood stages.

Obstructions to Flows

Natural obstructions to flows include trees, brush and other vegetation, which grow along the stream banks in the floodway areas. Man-made encroachments on or over the streams such as dams, bridges and culverts can also create more extensive flooding than would otherwise occur. A complete listing of all the bridges, including their stream bed elevation, low chord elevation, and the water surface elevation for various frequency floods is shown on Table 7. Dam data in the study area is shown on Table 8.

During floods, ice, trees, brush, and other vegetation which grow in the floodways impede flood flows, create backwater effects, and increase flood heights. Trees and other debris may be washed away and carried downstream to collect on bridges and other obstructions to flow. This debris plugs the bridge or culvert entrances and retards flows. These retarded flows produce additional upstream flooding, erode culvert entrances and bridge approach embankments, and damage overlying road beds. When masses of debris break loose, the debris and impounded water surge downstream until another obstruction is encountered. This debris may collect against a bridge until the load exceeds its structural capacity, and the bridge is destroyed.

Generally, obstructions at bridges and culverts restrict flows, raise water surface elevations in overbank areas and result in unpredictable areas of flooding, destruction, and damage. Since it is impossible to predict the degree or location of the accumulation of debris, therefore, for the purposes of this report, it was assumed that there would be no accumulation of debris at any of the bridges or culverts. Photographs of typical bridges, dams and other stream characteristics are shown on Figures 1 through 8. Examples of obstructions to flow are shown on Figures 9 and 10.

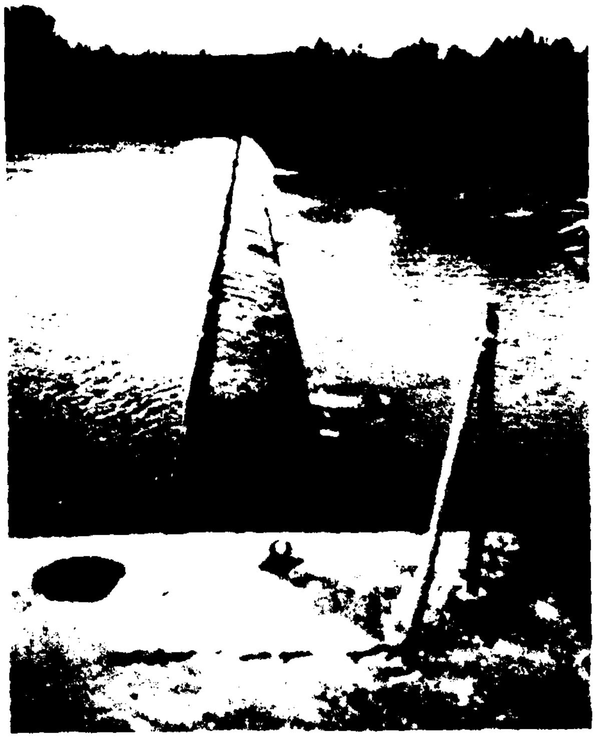


Figure 1 - Crest of Deferiet Dam, stream mile 26.53.

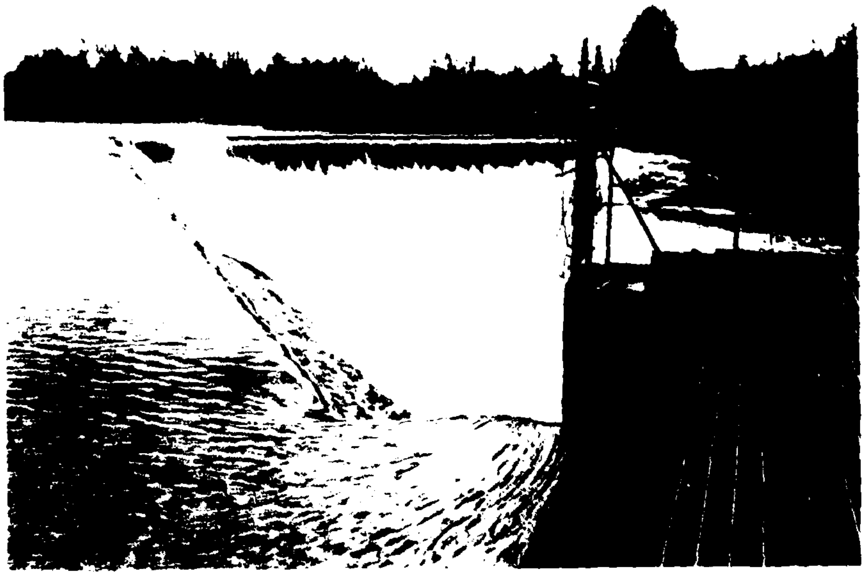


Figure 2 - Crest of Herring Dam, stream mile 28.16.

Both photographs were taken in October 1976.

Figure 3 - Upstream face of abandoned railroad bridge, stream mile 30.06.

Figure 4 - Low dam along right bank at stream mile 31.82.

Both photographs were taken in October 1976.

Figure 5 - Crest of Carthage State Dam at stream mile 31.92.

Figure 6 - Upstream face of State Route 26 bridge at stream mile 32.14.

Both photographs were taken in October 1976.

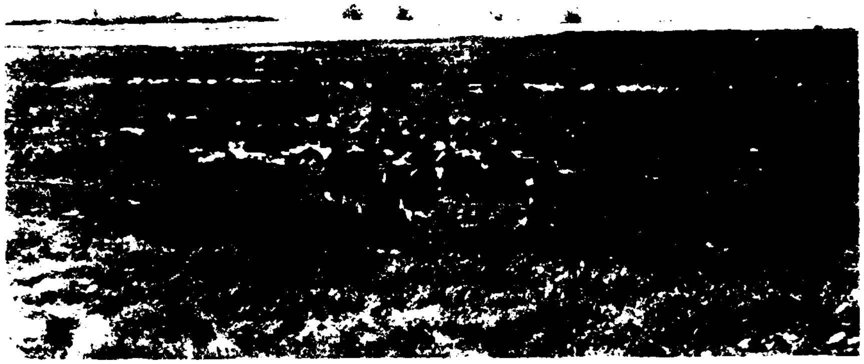


Figure 7 -- Pasture along right bank at stream mile 35.90.
Note wide, flat flood plain.

Figure 8 - Mouth of Deer River at Black River at stream mile 37.22.

Both photographs were taken in October 1976.

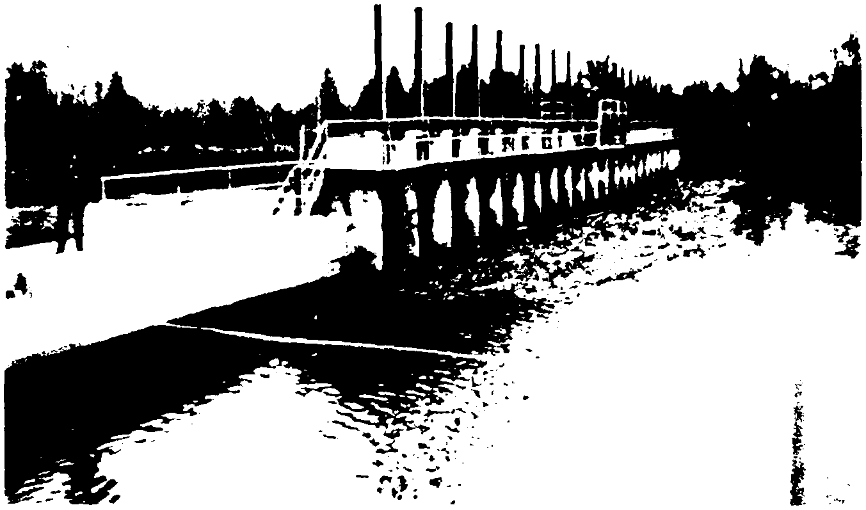


Figure 9 - Debris at gated structure near Deferiet Dam, stream mile 26.53.

Figure 10 - Debris near bridge at mill race, stream mile 31.82.

Both photographs were taken in October 1976.

UNIFIED FLOOD PLAIN MANAGEMENT PROGRAMS

Historically, the alleviation of flood damage has been accomplished almost exclusively by the construction of protective works such as reservoirs, channel improvements, and flood walls and levees. However, in spite of the billions of dollars that have already been spent for construction of well designed and efficient flood control works, annual flood damages continue to accelerate because the number of persons and structures occupying flood prone lands is increasing faster than protective works can be provided.

Recognition of this trend in recent years has forced a reassessment of the flood control concept and resulted in the broadened concept of unified flood plain management programs. A unified flood plain management program is composed of five overlapping components. The first is conventional structural measures including various combinations of reservoir storage, levees, and channel improvement. The second is land use management, which indicates the type of development that should be located within a specific flood prone area. The third is flood proofing which sets forth the design, use, and maintenance of those developments located on the flood plain to minimize losses when floods occur. The fourth is the development of adequate emergency preparations which include flood forecasting and temporary evacuation procedures. The fifth is the establishment of adequate flood insurance and catastrophy-aftermath relief measures which insure against total collapse of an area's economy and provide the affected individuals and businesses a means with which to rebuild and re-establish. Floods have first priority on the flood plains, and man should recognize this "fact of life" before encroaching. The concept of unified flood plain management can be expressed as the realization that in many instances it is far better for man to adjust to nature rather than to have nature adjust to man.

Flood Plain Regulations

Flood plain regulations apply to the full range of ordinances and other means designed to control land use and construction within flood prone areas. The term encompasses zoning ordinances, sub-division regulations, building and housing codes, encroachment line statutes, open area regulations, and other similar methods of management which affect the use and development of flood prone areas.

Flood plain land use management does not prohibit use of flood prone areas; to the contrary, flood plain land use management seeks the best use of flood plain lands. The flooded area maps, the water surface profiles, and the cross-sections contained in this report can be used to guide development in the flood plain. The elevations shown on the profiles should be used to determine flood heights because they are more

accurate than the flooded outlines. Development in areas susceptible to frequent flooding should consist of construction which has a low damage potential such as parking areas and golf courses. If high value construction such as buildings are considered for areas subject to frequent flooding, the land should be elevated to minimize damages. If it is uneconomical to elevate the land in these areas, means of flood proofing the structures should be given careful consideration.

Development Zones

A flood plain consists of two useful zones. The first zone is the designated "floodway" or that cross-sectional area required for carrying or discharging the anticipated flood waters. Velocities are greatest and most damaging in the floodway. Regulations essentially maintain the flow-conveying capability of the floodway to minimize inundation of additional adjacent areas. Uses which are acceptable for floodways include parks, parking areas, open spaces, etc. The vegetation cover of the floodways could be used as overland "Living Filters" for surface runoff during normal flow periods to reduce the pollutional impact of surface runoff prior to interception by the water course.

The second zone of the flood plain is termed the "floodway fringe" or restrictive zone, in which inundation might occur but where depths and velocities are generally low. Such areas can be developed provided structures are placed high enough or flood proofed to be reasonably free from flood damage during the Intermediate Regional (100-year) Flood.

Formulation of Flood Plain Regulations

Formulation of flood plain regulations in a simplified sense involves selecting the type and degree of control to be exercised for each specific flood plain. In principal, the form of the regulations is not as important as a maintained adequacy of control. The degree of control normally varies with the flood hazard as measured by depth of inundation, velocity of flow, frequency of flooding, and the need for available land. Considerable planning and research is required for the proper formulation of flood plain regulations. Where formulation of flood plain regulation is envisioned to require a lengthy period of time during which development is likely to occur, temporary regulations should be adopted to be amended as necessary.

Both the villages of West Carthage and Carthage have a flood plain district. The boundaries are shown on the map entitled "The Official Zoning Map of the Village, 1968." These flood plain districts are those areas along Black River which appear to be subjected to poor drainage and

flooding if the level of the river arises above normal maximums and flood conditions occur. Within such hazardous areas, further developments of a permanent nature are prohibited.

National Flood Insurance Program

The National Flood Insurance Act of 1968 provides previously unavailable flood insurance protection to property owners in flood-prone areas. The program is administered by the Federal Insurance Administration (FIA) of the U.S. Department of Housing and Urban Development (HUD) and is subsidized by Federal funds. It operates through an insurance industry pool under the auspices of the National Flood Insurers Association.

Communities in the study area participating in the Emergency Program of the National Flood Insurance Program are the villages of Carthage and West Carthage in Jefferson County and the towns of Denmark and Croghan in Lewis County.

To qualify for Federally subsidized flood insurance, a community must agree to adopt and enforce adequate land use and control measures consistent with Federal criteria. These criteria usually require a floodprone community to control development within the area that may be inundated by the 100-year flood.

OTHER FACTORS AND THEIR IMPACT ON FLOODING

Stillwater Reservoir was originally formed about 1885 and enlarged at various times. In 1924, it was enlarged to provide a storage capacity of 4,623,000,000 cubic feet between elevation 1650.3 and 1679.3. The reservoir is used to regulate flow on the Beaver and Black Rivers for flood control, power development, and general public welfare. The drainage area upstream of the reservoir is 172 square miles.

Flood Warning and Forecasting

At present there is no flood warning or forecasting network within the basin. However, the surveillance radar operated continuously by the National Weather Service at the Watertown Airport can provide for early detection of a storm and information concerning the predicted path and amount of rainfall. Radio and television stations can broadcast this information to the affected areas. Appropriate action can then be taken to minimize flood losses. The Hudson River - Black River Regulating District has been gathering stream data at several sites on the Black River in Lewis County. This data may be useful in predicting times of peak floods in downstream areas.

Flood Fighting and Emergency Evacuation Plans

Although there are no formal flood fighting or emergency evacuation plans for the study area, provisions for alerting area residents and coordinating

operations of town and county public service agencies in times of emergency are accomplished through the local governing agencies.

Material Storage on the Flood Plain

Because the flood plain of the Black River is largely undeveloped, there is very little danger of man-made floating materials being carried away by flood flows. However, a serious danger does exist because substantial quantities of dead timber from forested areas may be carried downstream by the flood flows.

PAST FLOODS

Flood Descriptions

Flooding in the Black River watershed occurs annually during the spring break-up and occasionally as a result of precipitation during other periods. Several large floods are summarized below:

a. April 1869 - The flood of 22 April 1869 occurred on the lower part of the river when the Forestport dam failed. This flood damaged nearly every mill on the stream from Forestport to Dexter. There was the usual spring flood when suddenly on the night of 21 April at Lyons Falls and in the morning on 22 April at Watertown, the water rose with great rapidity. The normal flood had reached its climax and had begun to recede when suddenly there came a rise of 8 to 10 feet in a brief period. The estimated peak discharge at Watertown was 39,700 cfs.

b. April 1928 - The fall and winter of 1927-28 were unusually wet, and ground water was at a high stage. The base flow at Watertown was 10,000 cfs. A heavy accumulation of snow in the Adirondack Highlands had hardly begun to melt when the weather turned warm about 1 April and continued abnormally warm to 8 April. The flood was caused almost entirely by melting snow. A snow survey made 15-17 March showed that the average depth of snow on the headwaters of the river was about 30 inches with a water content of from seven to eight inches. Only about half the snow was melted during the warm period which was terminated by a sudden and severe freeze-up. The melting of the snow was completely checked and the accumulated water passed off without great damage. Had the warm weather continued two or three days longer or had there been a moderately heavy rain during the melting period, the flood flows would have been much greater. The peak discharge at Watertown was 33,900 cfs.

c. April 1963 - The "highest water ever" is the way many long-term residents of Carthage described the scene as the muddy Black River rose. Receiving runoff water from many feeder streams along its twisted course, the river overflowed its bank in countless places, like South Mechanic Street, where some 14 inches of water caused the street to be closed to

traffic. Rowboats were used on South Mechanic Street. At least two families had to evacuate their homes temporarily. Near the north village limit of Carthage, Gamble Machine Inc. was literally flooded out of business by eight inches of water in its machine shop and three feet of water in the basement. Cool weather over the weekend helped lower the levels of streams to what was considered normal for this time of year. One man drowned as his boat capsized at railroad tracks in the town of Wilna. A swift current hampered rescue operations. The peak discharge at Watertown was 36,700 cfs.

d. March 1977 - On 7 March, the Black River Basin had an average snow depth of about three feet, with an average water content of more than 10 inches. The water content was estimated to be about 42 percent above normal. From 8-16 March, the average low and high temperatures for the entire basin ranged from about freezing to the mid-fifties. The average rainfall for the basin from 13 March to 16 March was nearly two inches. The combined factors of warm thawing temperatures, high water content of the snow, and nearly two inches of rain produced tremendous runoff in the entire basin. Measurements at the Watertown gage revealed that the discharge had reached 25,000 cfs by 6:00 p.m. on 14 March. This discharge already caused levels that were higher than normal spring high water levels. A tremendous volume of water passed through the river at Watertown from 13 March to 21 March. The peak discharge, measured at 1:00 p.m. on 16 March, was 39,200 cfs, the greatest recorded discharge.

The greatest amount of residential and commercial damage in the study area occurred in the villages of West Carthage and Carthage. Sandbag levees were constructed to prevent flooding at two commercial plants. Because of basement flooding at approximately 60 homes, various pumping operations were conducted by the local officials. Some homes were affected by backup flow conditions. The Carthage Sewage Plant was inoperative for a couple days. Two roads were closed, along with a railroad spur in the village of Carthage. One small business experienced flooding on its first floor, while two mills adjacent to the river received minor damage. State Route 3 in the town of Wilna was inundated, but passable. South Main Street in West Carthage was closed. Upstream of Carthage in the "Flats" area, thousands of acres of farm land were inundated.

Agricultural damage consisted of: losses to farm lands, farm equipment and buildings and loss of milk production and shipment. In the fields there were widespread standing flood waters that were from 1/2 to two miles wide and six feet deep. Flooding conditions in March 1977 are shown on Figures 11 through 14.

Figure 11 - Flooding conditions in March 1977 at barn on west side of State Route 3 in town of Wilna at stream mile 28.26.

Figure 12 - Flooding conditions in March 1977 along State Route 3 in town of Wilna at stream mile 28.66.

Both photographs were taken in March 1977.

Figure 13 - Flooding conditions in March 1977 at east side of State Route 3 in town of Wilna at stream mile 30.84.

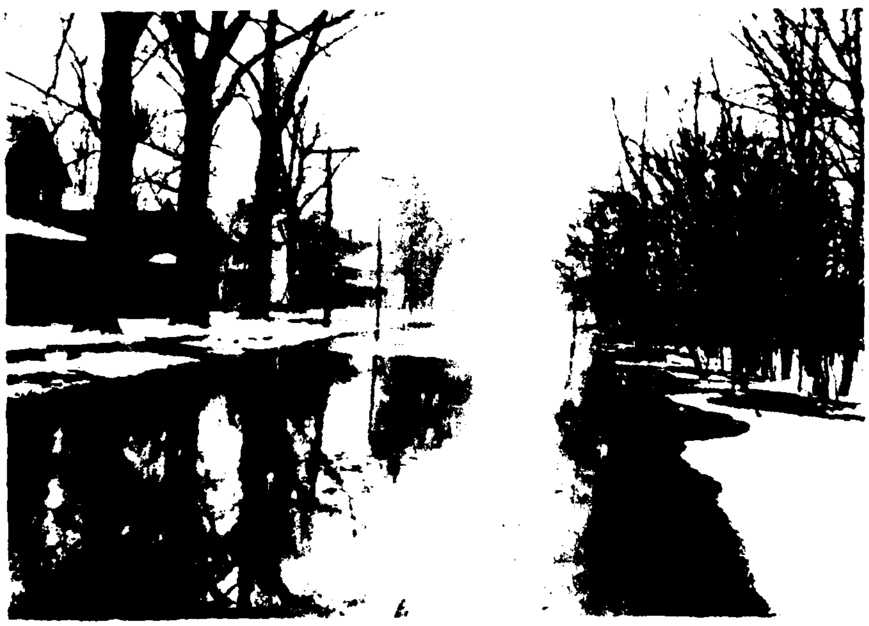


Figure 14 - Flooding conditions in March 1977 along South Mechanic Street in village of Carthage at stream mile 32.35.

Both photographs were taken in March 1977.

FUTURE FLOODS

Floods of the same or larger magnitude as those that have occurred in the past are likely to occur some time in the future. Larger floods have been experienced in the past on streams with similar geographical and physiographical characteristics as those found in the study area. Similar combinations of rainfall, snowmelt and runoff which caused these floods could occur within the study area. To assess the flooding potential of the study area, it is necessary to consider storms and floods that have occurred in regions with the same topography, watershed cover and physical characteristics.

Flood Magnitudes and Their Frequencies

Floods are classified on the basis of their frequency or return period. A 100-year flood is an event whose magnitude can be expected to be equaled or exceeded on the average of once every hundred years. The 100-year event has a 1 percent chance of occurrence in any given year. It is important to note that, while on a long-term basis the occurrence averages out to once per hundred years, floods of this magnitude can occur in any given year or even in consecutive years and within any given time interval. The 100-year flood has also been known as the "Intermediate Regional Flood" (IRF).

Similarly, the 10-, 50- and 500-year flood events are those floods whose magnitudes can, on the long term, be expected to occur on the average of once in every 10, 50 or 500 years.

It should be noted that there is a greater than 50 percent probability that a 100-year flood event will occur during a 70-year lifetime. Additionally, a house which is built at the 100-year flood level has a one in four chance of being flooded in a 30-year mortgage life.

Table 5 is a summary of peak discharges for various recurrence intervals (in years) at the USGS gage at Watertown, at the Deferiet Dam, and at the Carthage State Dam.

Floods larger then the 500-year flood are possible. However, the probability of the necessary coincident climatic conditions arising is sufficiently remote to preclude this consideration. Although it would be catastrophic if such floods occurred in a developed stream valley, their size and rarity are such that protective flood works can seldom be economically justified.

Hazards and Damages of Large Floods

The extent of damage caused by any flood depends on the topography of the flooded area, the depth and duration of flooding, the velocity of flow, the rate of rise in water surface elevation, and developments in

the flood plain. Deep water flowing at a high velocity and carrying floating debris would create conditions hazardous to persons and vehicles which attempt to cross the flood plain. Generally, water three or more feet deep which flows at a velocity of three or more feet per second could easily sweep an adult off his feet and create definite danger of injury or drowning. Rapidly rising and swiftly flowing flood water may trap persons in homes that are ultimately destroyed or in vehicles that are ultimately submerged or floated. Since water lines can be ruptured by deposits of debris and by the force of flood waters, there is the possibility of contaminated domestic water supplies. Damaged sanitary sewer lines and sewage treatment plants could result in the pollution of flood waters and could create health hazards. Isolation of areas by flood water could create hazards in terms of medical, fire or law enforcement emergencies.

Flooded Areas

The Index Map, Plate 2, locates the reach limits of each flooded area map, Plates 3 through 6. The areas that would be inundated by the 100-year and 500-year floods are shown in detail on those plates. The actual limits of these overflow areas may vary somewhat from those shown on the maps because the 10-foot contour interval and scale of the maps do not permit precise plotting of the flooded area boundaries. Plates 7 and 8 show water surface profiles for the 500-, 100-, 50- and 10-year floods. In all cases, it was assumed that the gated structures at both Deferiet and Herring Dams are closed. Depth of flow in the channel can be estimated from these plates. Typical cross sections of the flood plain at selected locations, together with the water surface elevation and lateral extent of the 500-, 100-, 50- and 10-year floods are shown on Plates 9 through 11.

Table 6 is a list of elevation reference marks. The list is furnished as an aid to local interests in setting minimum elevations for future development or establishing other elevations necessary to flood plain planning. All elevations in this report are on U.S. Coast and Geodetic Datum.

Obstructions

During floods, debris collecting on bridges could decrease their flow-carrying capacity and cause greater water depths (backwater effect) upstream of these structures. Since the occurrence and amount of debris are indeterminate factors, only the physical characteristics of the structures were considered in preparing the profiles. No reduction in the carrying capacity from clogging or jamming was considered. Similarly, the flooded area maps show the backwater effect of obstructive bridges, but do not reflect increased water surface elevations that could be caused by debris collecting against the structures. All three of the bridges are

obstructive to the 100-year and 500-year floods. In all cases, the bridges are high enough so as not to be inundated by flood flows. However, the approaches to these bridges may be at lower elevations and subject to flooding and rendered impassable.

Table 7 summarizes pertinent bridge data and lists water surface elevations for the 500- and 100-year floods.

Velocities of Flow

Water velocities during floods depend largely on the size and shape of the cross sections, the conditions of the stream, and the channel bed slope. All of these vary on different streams and at different locations on the same stream. Table 9 shows average channel and overbank velocities for the 100-year and the 500-year floods. During a 100-year flood, velocities in the main channel of the study area would range from 2.3 feet per second in the "Flats" area to 15.0 feet per second at stream mile 28.1. Water flowing at this rate is capable of causing severe erosion to stream banks and embankments at bridge abutments and of transporting large objects. Velocities in overbank areas would average 0.1 to 0.9 foot per second. Water flowing at two feet per second or less would deposit debris and silt.

Rates of Rise and Duration of Flooding

Rates of rise are dependent upon the basin antecedent conditions, intensity of the storm, development within the basin, and debris in the channel at the time of the storm.

The duration of a flood is dependent upon the duration of the storm, the storage capacity of the overbank area, prolonged runoff from snowmelt, and high stages caused by ice jams, etc.

It is impossible to predict accurate rates of rise and duration of flooding because many variations in rainfall distribution could produce the 100-year peak discharge with a variety of rise rates. During the March 1977 flood, the water rose 0.1 foot every two hours at the Conrail bridge in Carthage. This represents only the average rate of rise above bankfull stage.

A study of the nature of flooding indicates that the Black River, in areas downstream of Carthage, is prone to rapid and dangerous rates of rise.

Photographs, Future Flood Heights

The expected levels of the 100-year and 500-year floods at various locations in the study area are indicated on Figures 15 through 20.

Figure 15 - The 100- and 500-year flood heights at the Deferiet Dam at stream mile 26.53 are shown.

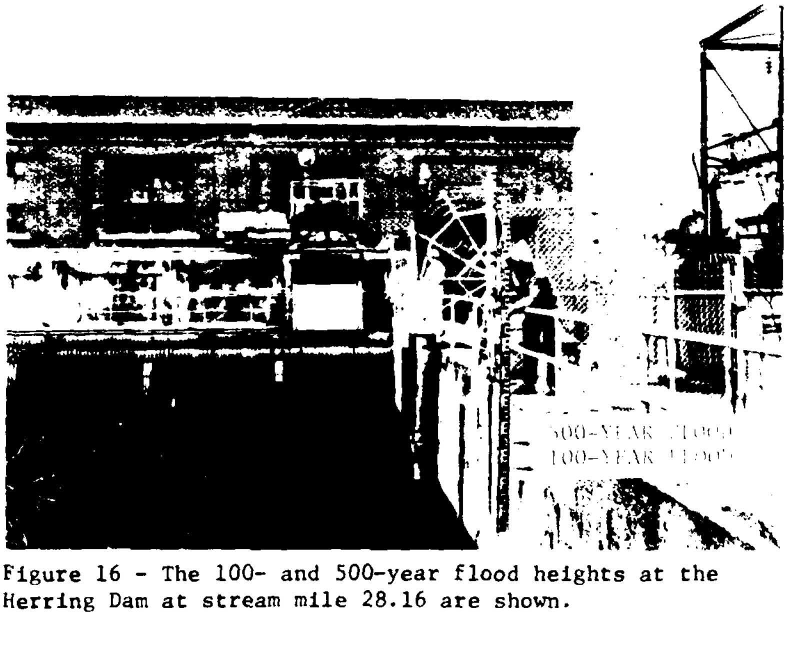


Figure 16 - The 100- and 500-year flood heights at the Herring Dam at stream mile 28.16 are shown.

Both photographs were taken in October 1976.

Figure 17 - The 100- and 500-year flood heights at the upstream face of the abandoned railroad bridge at stream mile 30.06 are shown. Photograph was taken in June 1977.

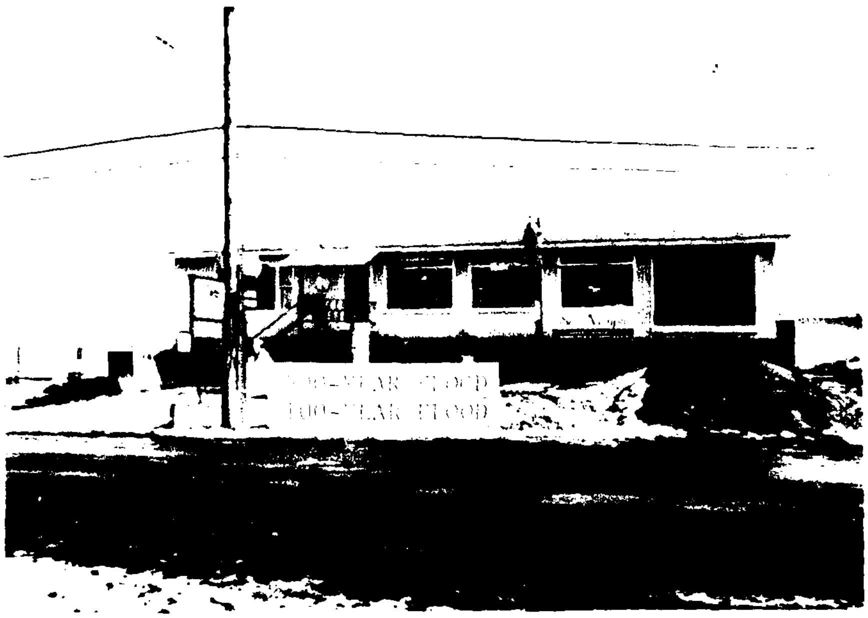


Figure 18 - The 100- and 500-year flood heights along State Route 3 at stream mile 30.84 are shown. Photograph was taken in October 1976.

Figure 19 - The 100- and 500-year flood heights at parking lot in Carthage at stream mile 32.2 are shown.

Figure 20 - The 100- and 500-year flood heights along South Mechanic Street in Carthage at mile 32.35 are shown.

Both photographs were taken in October 1976.

Table 5 - Peak Flows on Black River for Various Recurrence Intervals

Location	Stream Mile	Drainage Area (Sq. Mi.)	10-Year Discharge (cfs)	50-Year Discharge (cfs)	100-Year (IRF) Discharge (cfs)	500-Year Discharge (cfs)
USGS gage at Watertown	8.10	1876	29,900	37,800	41,300	49,700
Deferiet Dam	26.53	1818	29,000	36,700	40,100	48,200
Carthage State Dam	31.92	1806	28,800	36,400	39,800	47,900

Table 6 - Elevation Reference Marks in the Study Area

Approximate River Mile	Elevation in Feet on U.S.C.&G.S. Datum	Bench Mark Description
26.53	669.90	Chiselled square in top of N.E. concrete abutment at downstream side of Route 3 bridge at diversion channel near Deferiet Dam in town of Wilna. Abutment is at north side of bridge.
28.16	689.28	Chiselled square in top of concrete retaining wall on E. side of Black River at Herring Dam, 6' from south end, 1.7' from east face in town of Wilna.
29.10	691.03	Spike, 2-1/2 feet above ground, in power pole #NM93 & NY Tel. 106, on E. side of Route 3 in town of Wilna, approximately 0.5 mile S. of Herring Dam along Route 3. Spike is on road side of pole.
30.06	687.99	Chiselled square in the concrete seat of N.E. abutment at abandoned RR bridge in town of Wilna.
30.50	701.99	Spike, 2' above ground at power pole #NH 55-56900 & NY Tel. 55 at east side of Route 3 at T.W. Patnode residence in town of Wilna, approximately 0.2 mile north of Carthage Village limits along Route 3. Spike is on road side of pole.

Table 6 - Elevation Reference Marks in the Study Area (Continued)

Approximate River Mile	Elevation in Feet on U.S.C.&G.S. Datum	Bench Mark Description
31.82	726.70	Chiselled square on S.E. concrete abutment, upstream side of bridge along east bank of Black River and about 900' downstream of Carthage State Dam in village of Carthage.
32.19	741.25	Chiselled square on N.E. corner of upstream wingwall at east end of Conrail bridge in village of Carthage.

Table 7 - Bridge Data in the Study Area

Bridge	Miles From Mouth	Approximate Stream Bed Elevation	Average Low Chord Elevation	Average Bridge Floor Elevation	Water Surface Elevation (a)	
					100-Year	500-Year
Abandoned RR	30.06	660.9	687.9	691.9	687.0	688.6
State Route 26	32.13	712.8	747.3	751.5	733.1	734.1
Conrail	32.19	711.7	737.5	742.4	733.4	734.4

Note: All elevations are on U.S.C.&G.S. Datum.

(a) All elevations are on the upstream side of the respective bridge.

Table 8 - Dam Data in the Study Area

Miles From Mouth	Average Crest Elevation	Water Surface Elevation (a)	
		100-Year	500-Year
26.53	656.0	663.1	664.0
28.16	679.1	686.3	687.2
31.58	702.0	708.2	709.1
31.92	726.4	731.9	732.6

Note: All elevations are on U.S.C.&G.S. Datum.

(a) All elevations are on the upstream side of the dam.

Table 9 - 100- and 500-Year Discharges and Average Velocities

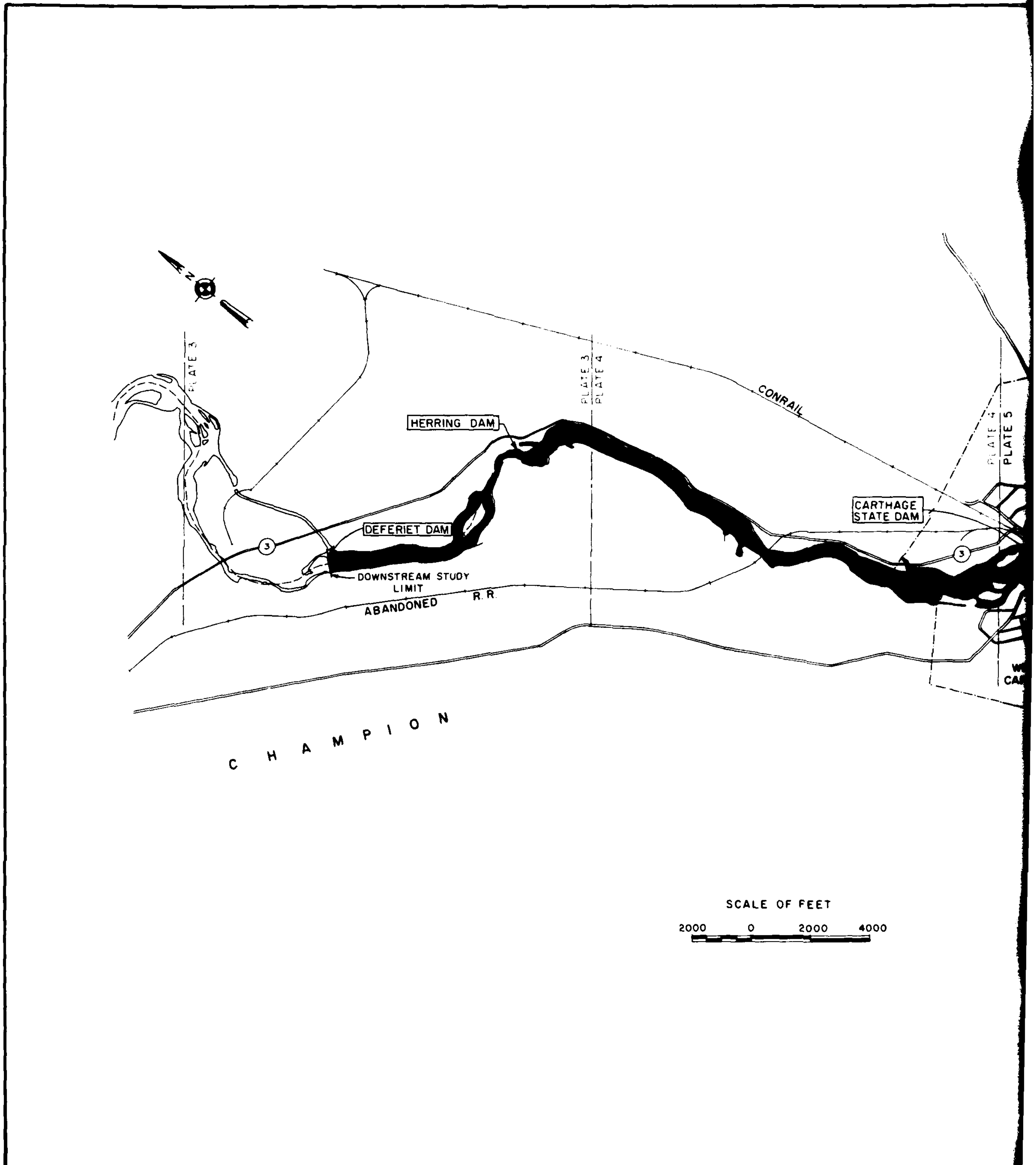
Stream Mile	Discharge in cfs		Average Velocity (feet per Second)			
			Channel		Overbank	
	100-Year	500-Year	100-Year	500-Year	100-Year	500-Year
27.60	40.100	48,200	4.7	5.1	0.6	0.8
28.10	40,100	48,200	15.0	16.0	0.4	1.2
28.40	40,100	48,200	4.1	4.6	0.9	0.9
29.10	40,100	48,200	3.3	3.8	-	0.1
30.50	40,100	48,200	4.3	4.7	0.4	0.6
31.10	40,100	48,200	2.3	2.3	0.1	0.3
31.91*	40,100	48,200	8.2	8.9	-	-
32.86	39,800	47,900	3.7	3.7	0.7	1.0
34.62	39,800	47,900	4.4	4.6	0.9	1.0
36.32	39,800	47,900	3.2	3.2	0.7	0.8

*Downstream of Carthage State Dam

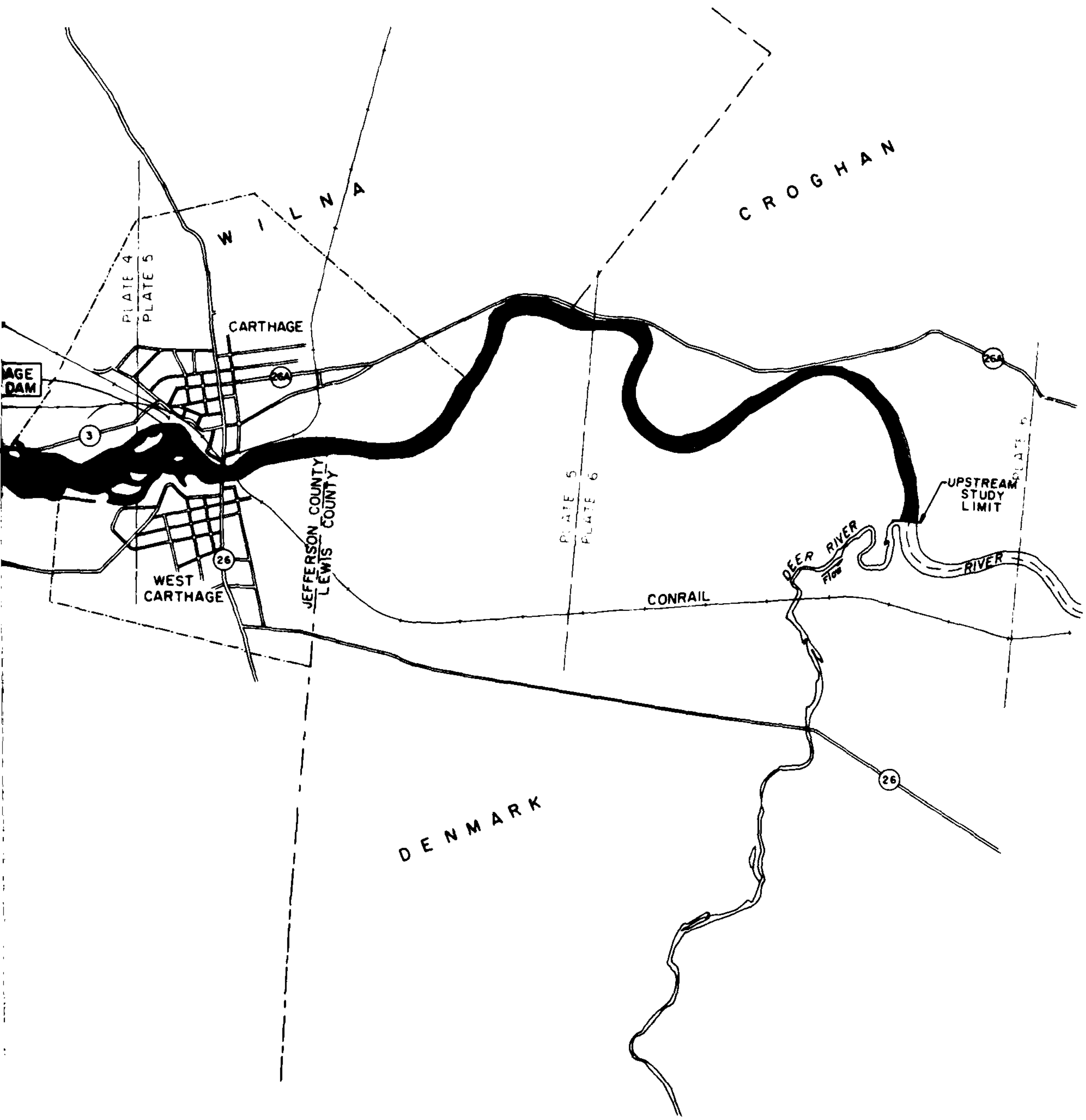
GLOSSARY

BACKWATER	The resulting high water surface in a given stream due to a downstream obstruction or high stages in an intersecting stream.
DISCHARGE	The quantity of flow in a stream at any given time, usually measured in cubic feet per second (cfs).
FLOOD	An overflow of lands not normally covered by water. Floods have two essential characteristics: The inundation of land is temporary; and the lands are adjacent to and inundated by overflow from a river, stream, ocean, lake, or other body of standing water. Normally a "flood" is considered as any temporary rise in streamflow or stage, but not the ponding of surface water, that results in significant adverse effects in the vicinity. Adverse effects may include damages from overflow of land areas, temporary backwater effects in sewers and local drainage channels, creation of unsanitary conditions or other unfavorable situations by deposition of materials in stream channels during flood recessions, rise of ground water coincident with increased streamflow, and other problems.
FLOOD CREST	The maximum stage or elevation reached by flood waters at a given location.
FLOOD PLAIN	The areas adjoining a river, stream, watercourse, ocean, lake or other body of standing water that have been or may be covered by floodwater.
FLOOD PROFILE	A graph showing the relationship of water surface elevation to location, the latter generally expressed as distance upstream from mouth for a stream of water that flows in an open channel. It is generally drawn to show surface elevation for the crest of a specific flood but may be prepared for conditions at a given time or stage.

FLOOD STAGE	The stage or elevation at which overflow of the natural banks of a stream or body of water begins in the reach or area in which the elevation is measured.
FLOODWAY	The channel of a watercourse and that portion of the adjoining flood plain required to provide for the passage of the *Intermediate Regional Flood.*
INTERMEDIATE REGIONAL FLOOD (IRF)	A flood which has an average frequency of occurrence in the order of once in 100 years although the flood may occur in any year. It is based on statistical analysis of streamflow records available for the watershed and analysis of rainfall and runoff characteristics in the general region of the watershed. It is commonly referred to as the "100-year flood."
LOW CHORD	The elevation at the top of the opening of a bridge or other structure through which water may flow along a watercourse.



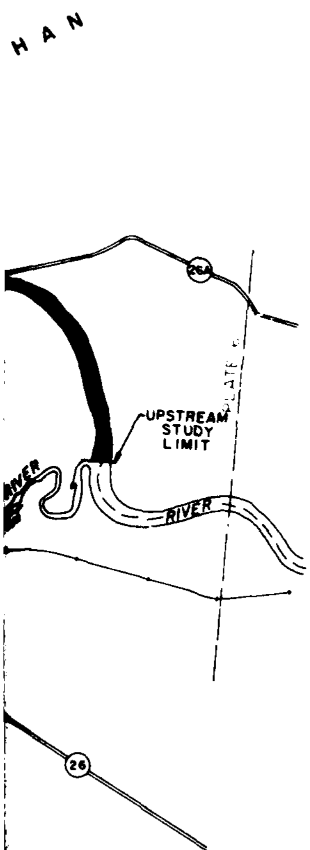
N
PLATE 3
PLATE 3
PLATE 4
CONRAIL
HERRING DAM
DEFERIET DAM
DOWNSTREAM STUDY
LIMIT
ABANDONED R.R.
3
CARTHAGE
STATE DAM
PLATE 4
PLATE 5
C H A M P I O N
SCALE OF FEET
2000 0 2000 4000



DEPARTM
BUFFALO DIST
BUFF
FLOOD PL
BLACK
DEF
CONFLU

IN

N



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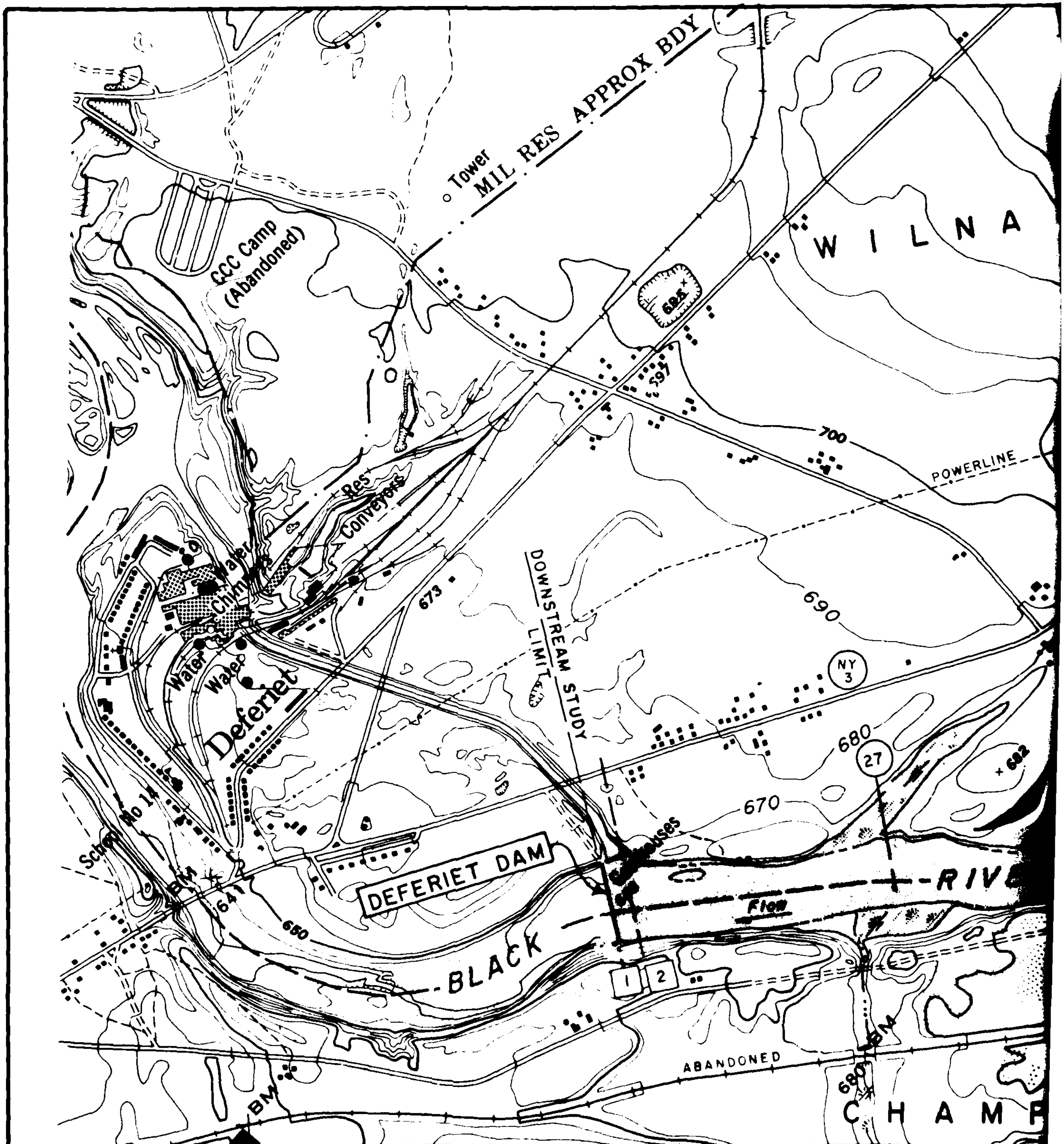
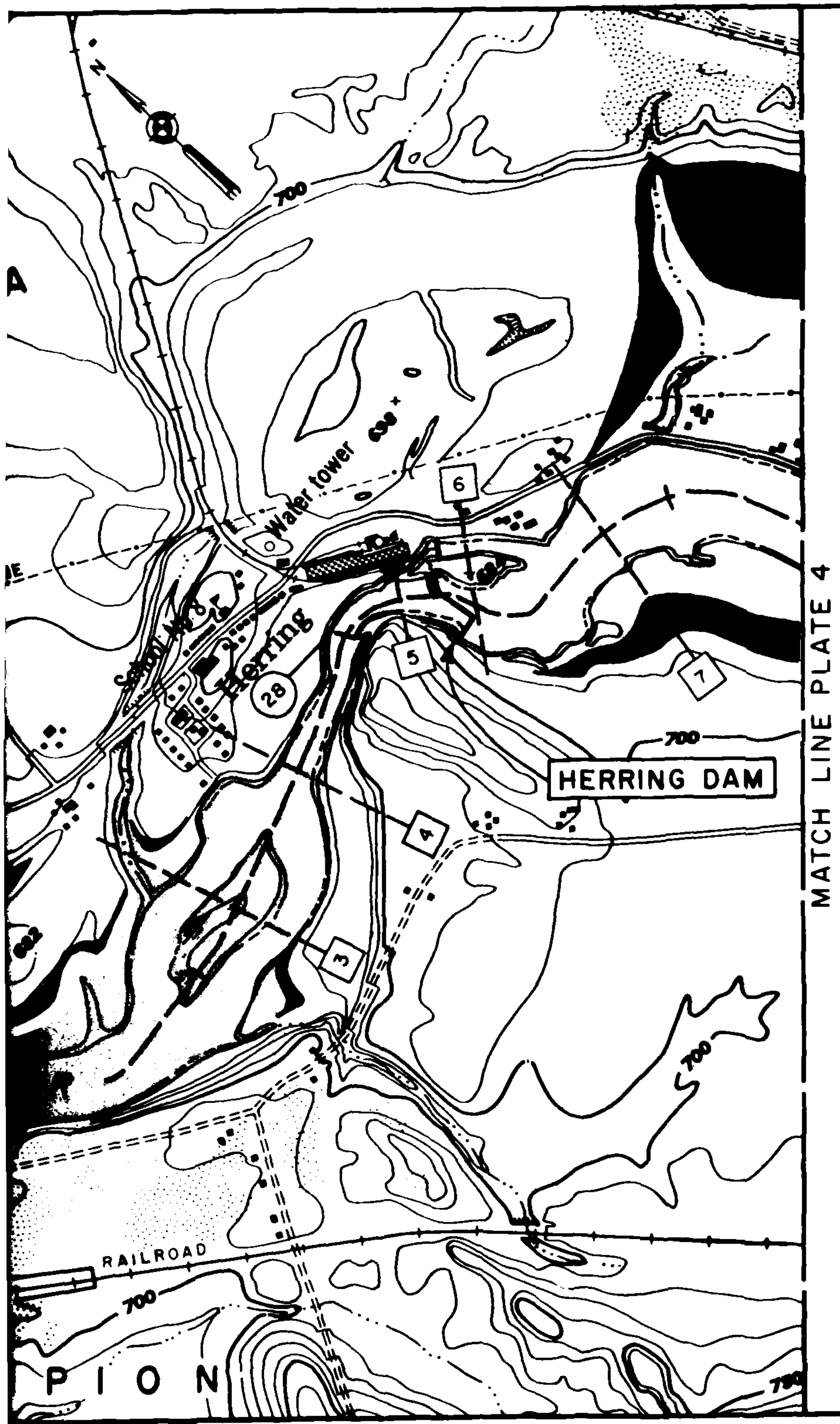
BUFFALO DISTRICT, CORPS OF ENGINEERS
BUFFALO, NEW YORK

FLOOD PLAIN INFORMATION
BLACK RIVER, NEW YORK
DEFERIET DAM TO
CONFLUENCE DEER RIVER

INDEX MAP

NOVEMBER 1977


MIL RES APPROX BDY
Tower
WILNA
CCC Camp (Abandoned)
685
597
700
POWERLINE
Res
Conveyors
Chimney
Water
Deferiet
673
690
NY 3
DOWNSTREAM STUDY LIMIT
680
27
682
670
School No 14
BM
641
650
DEFERIET DAM
Flow
RIVER
BLACK
1
2
ABANDONED
CHAMP



LEGEND

3 CROSS SECTION

CHANNEL LIMITS

27 MILES FROM MOUTH

— 750 — GROUND ELEVATION IN FEET (U.S.C.& G.S. SEA LEVEL DATUM OF 1929)

100-YEAR FLOOD

500-YEAR FLOOD

NOTES

1. MAP BASED ON U.S.G.S. 7.5 MIN. QUADRANGLE SHEET, NORTH WILNA 1949. MINOR ADDITIONS AND ADJUSTMENTS WERE MADE BY CORPS OF ENGINEERS.

2. LIMITS OF OVERFLOW SHOWN MAY VARY FROM ACTUAL LOCATION ON GROUND AS EXPLAINED IN THE REPORT.

3. AREAS OUTSIDE THE FLOOD PLAIN MAY BE SUBJECT TO FLOODING FROM LOCAL RUNOFF.

4. MINIMUM CONTOUR INTERVAL IS 10 FT.

SCALE IN FEET

0 1000 2000

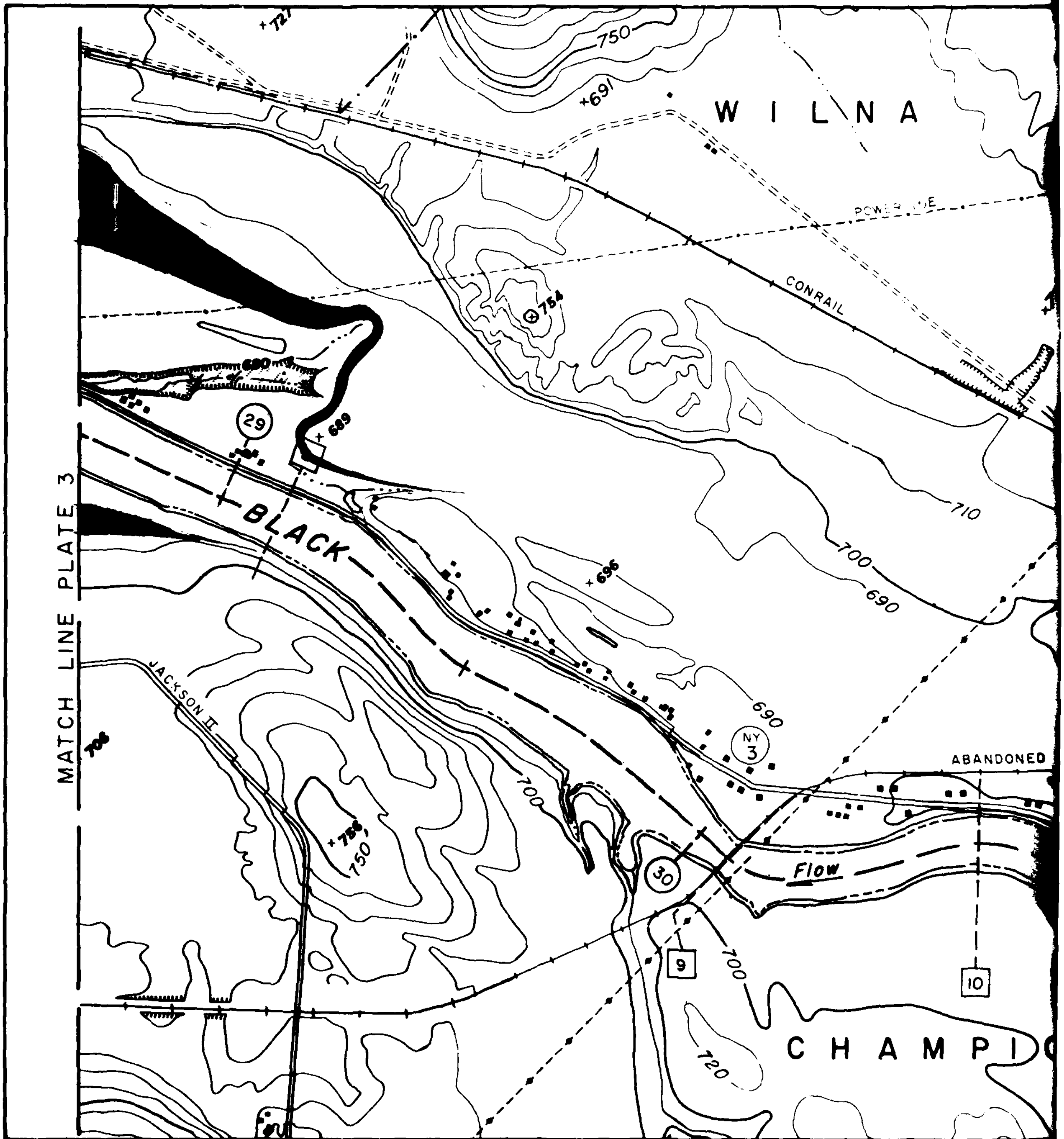
DEPARTMENT OF THE ARMY
BUFFALO DISTRICT, CORPS OF ENGINEERS
BUFFALO, NEW YORK

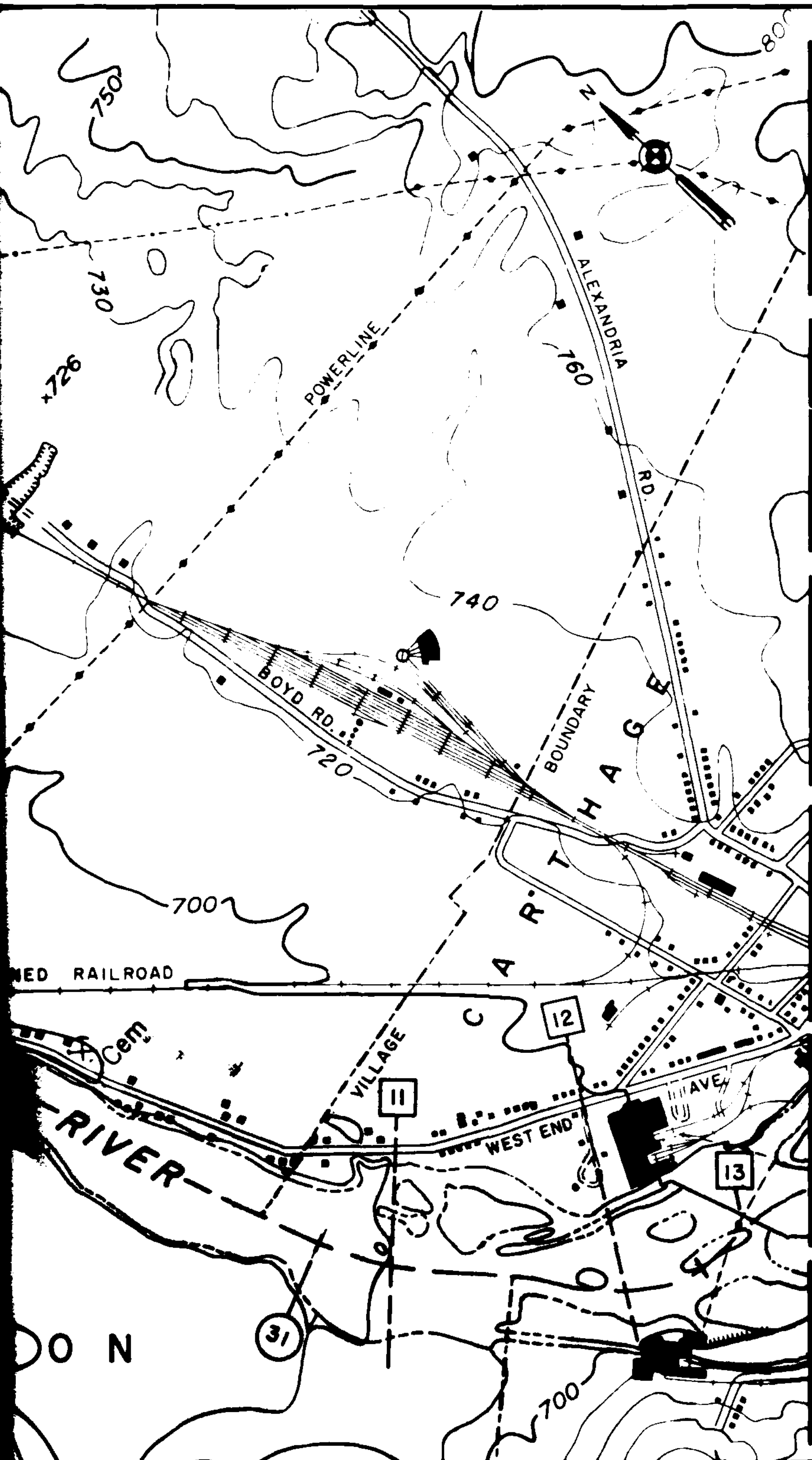
FLOOD PLAIN INFORMATION
BLACK RIVER, NEW YORK
DEFERIET DAM TO
CONFLUENCE DEER RIVER

FLOODED AREAS

NOVEMBER 1977

PLATE 3


WILNA
CHAMPI
BLACK
Flow
MATCH LINE PLATE 3
CONRAIL
POWER LINE
ABANDONED
JACKSON II
NY 3
29
30
9
10
750
710
700
690
720
+691
+689
+696
+756
754
690



LEGEND

12 CROSS SECTION

CHANNEL LIMITS

30 MILES FROM MOUTH

—730— GROUND ELEVATION IN FEET (U.S.C.& G.S. SEA LEVEL DATUM OF 1929)

100-YEAR FLOOD

500 YEAR FLOOD

NOTES

1. MAP BASED ON U.S.G.S. 7.5 MIN. QUADRANGLE SHEETS N.WILNA 1949, COPENHAGEN 1942, CARTHAGE 1943, AND DEFERIET 1949. MINOR ADDITIONS AND ADJUSTMENTS WERE MADE BY CORPS OF ENGINEERS.

2. LIMITS OF OVERFLOW SHOWN MAY VARY FROM ACTUAL LOCATION ON GROUND AS EXPLAINED IN THE REPORT.

3. AREAS OUTSIDE THE FLOOD PLAIN MAY BE SUBJECT TO FLOODING FROM LOCAL RUNOFF.

4. MINIMUM CONTOUR INTERVAL IS 10 FT

SCALE IN FEET

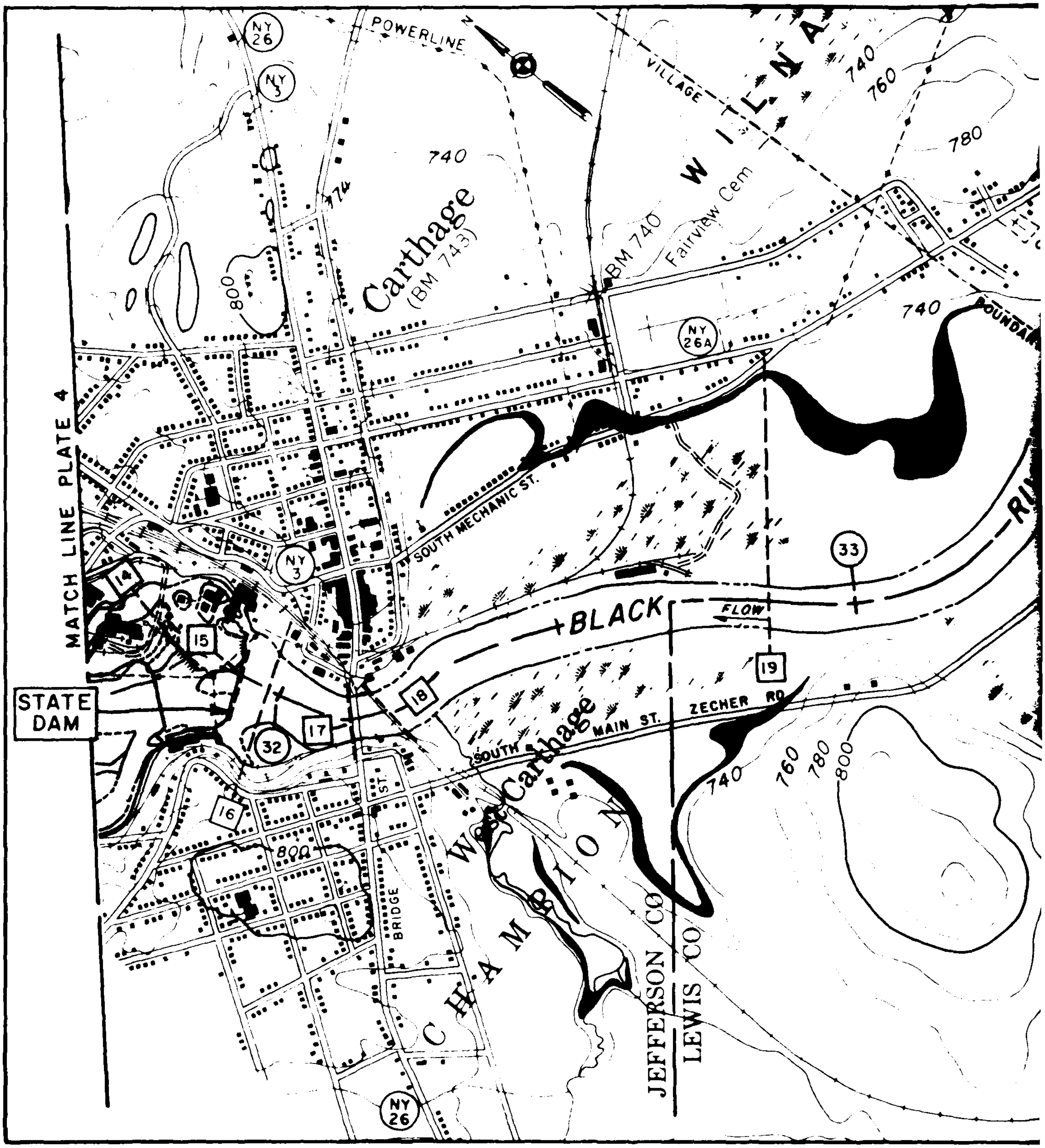
0 1000 2000

DEPARTMENT OF THE ARMY
BUFFALO DISTRICT, CORPS OF ENGINEERS
BUFFALO, NEW YORK

FLOOD PLAIN INFORMATION
BLACK RIVER, NEW YORK
DEFERIET DAM TO
CONFLUENCE DEER RIVER

FLOODED AREAS

NOVEMBER 1977



MATCH LINE PLATE 4
STATE DAM
POWERLINE
VILLAGE
NY 26
NY 3
NY 26A
740
760
780
800
Carthage (BM 743)
BM 740
Fairview Cem
W I L N A
BOUNDARY
SOUTH MECHANIC ST.
BLACK
FLOW
RI
14
15
16
17
18
19
32
33
SOUTH MAIN ST.
ZECHER RD
West Carthage
BRIDGE ST.
C H A M P I O N
JEFFERSON CO
LEWIS CO

LEGEND

17 CROSS SECTION

CHANNEL LIMITS

32 MILES FROM MOUTH

—740— GROUND ELEVATION IN FEET (U.S.C.& G.S. SEA LEVEL DATUM OF 1929)

100-YEAR FLOOD

500 YEAR FLOOD

NOTES

1. MAP BASED ON U.S.G.S. 7.5 MIN. QUADRANGLE SHEETS, CARTHAGE 1943 AND COPENHAGEN 1942. MINOR ADDITIONS AND ADJUSTMENTS WERE MADE BY CORPS OF ENGINEERS.

2. LIMITS OF OVERFLOW SHOWN MAY VARY FROM ACTUAL LOCATION ON GROUND AS EXPLAINED IN THE REPORT.

3. AREAS OUTSIDE THE FLOOD PLAIN MAY BE SUBJECT TO FLOODING FROM LOCAL RUNOFF.

4. MINIMUM CONTOUR INTERVAL IS 10 FT.

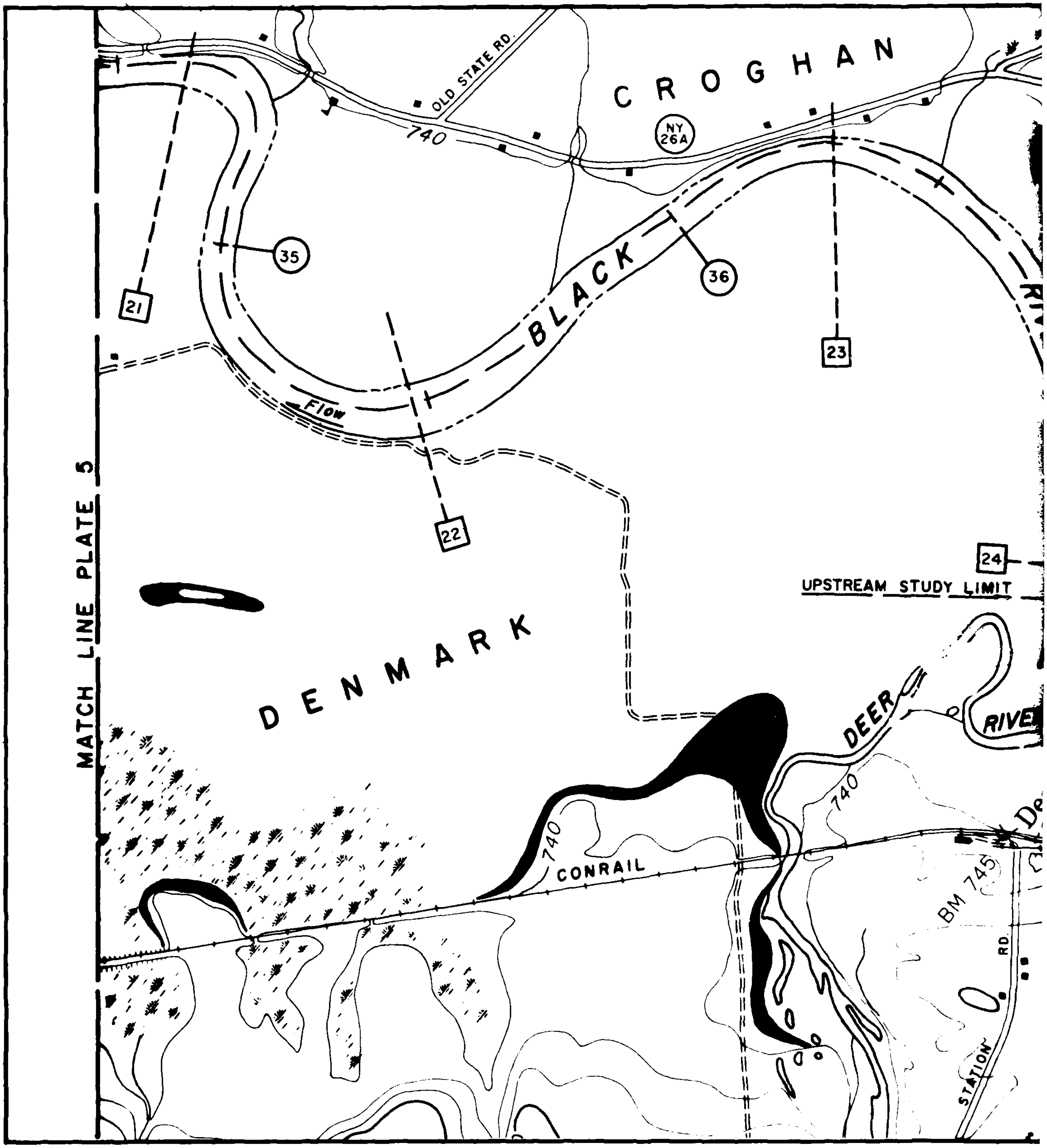
SCALE IN FEET

0 1000 2000

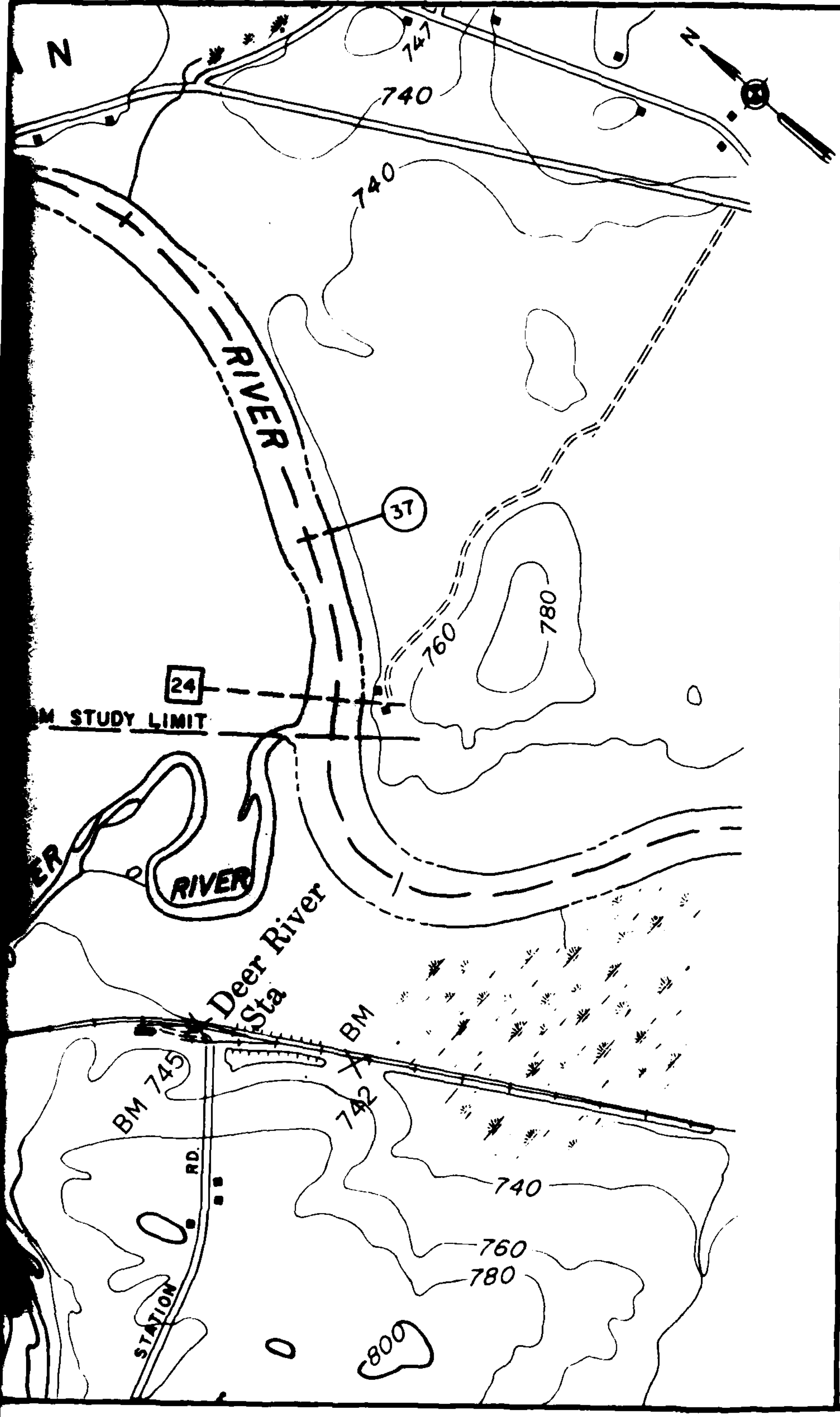
DEPARTMENT OF THE ARMY
BUFFALO DISTRICT, CORPS OF ENGINEERS
BUFFALO, NEW YORK

FLOOD PLAIN INFORMATION
BLACK RIVER, NEW YORK
DEFERIET DAM TO
CONFLUENCE DEER RIVER

FLOODED AREAS
NOVEMBER 1977



MATCH LINE PLATE 5
CROGHAN
OLD STATE RD.
NY 26A
740
35
36
21
22
23
24
BLACK
RIV
FLOW
UPSTREAM STUDY LIMIT
DENMARK
DEER
RIVER
CONRAIL
BM 745
RD.
STATION



LEGEND

23 CROSS SECTION

CHANNEL LIMITS

35 MILES FROM MOUTH

—750— GROUND ELEVATION IN FEET (U.S.C.& G.S. SEA LEVEL DATUM OF 1929)

100-YEAR FLOOD

500 YEAR FLOOD

NOTES

1. MAP BASED ON U.S.G.S. 7.5 MIN. QUADRANGLE SHEET, CARTHAGE 1943. MINOR ADDITIONS AND ADJUSTMENTS WERE MADE BY CORPS OF ENGINEERS.

2. LIMITS OF OVERFLOW SHOWN MAY VARY FROM ACTUAL LOCATION ON GROUND AS EXPLAINED IN THE REPORT.

3. AREAS OUTSIDE THE FLOOD PLAIN MAY BE SUBJECT TO FLOODING FROM LOCAL RUNOFF.

4. MINIMUM CONTOUR INTERVAL IS 10 FT.

SCALE IN FEET

0 1000 2000

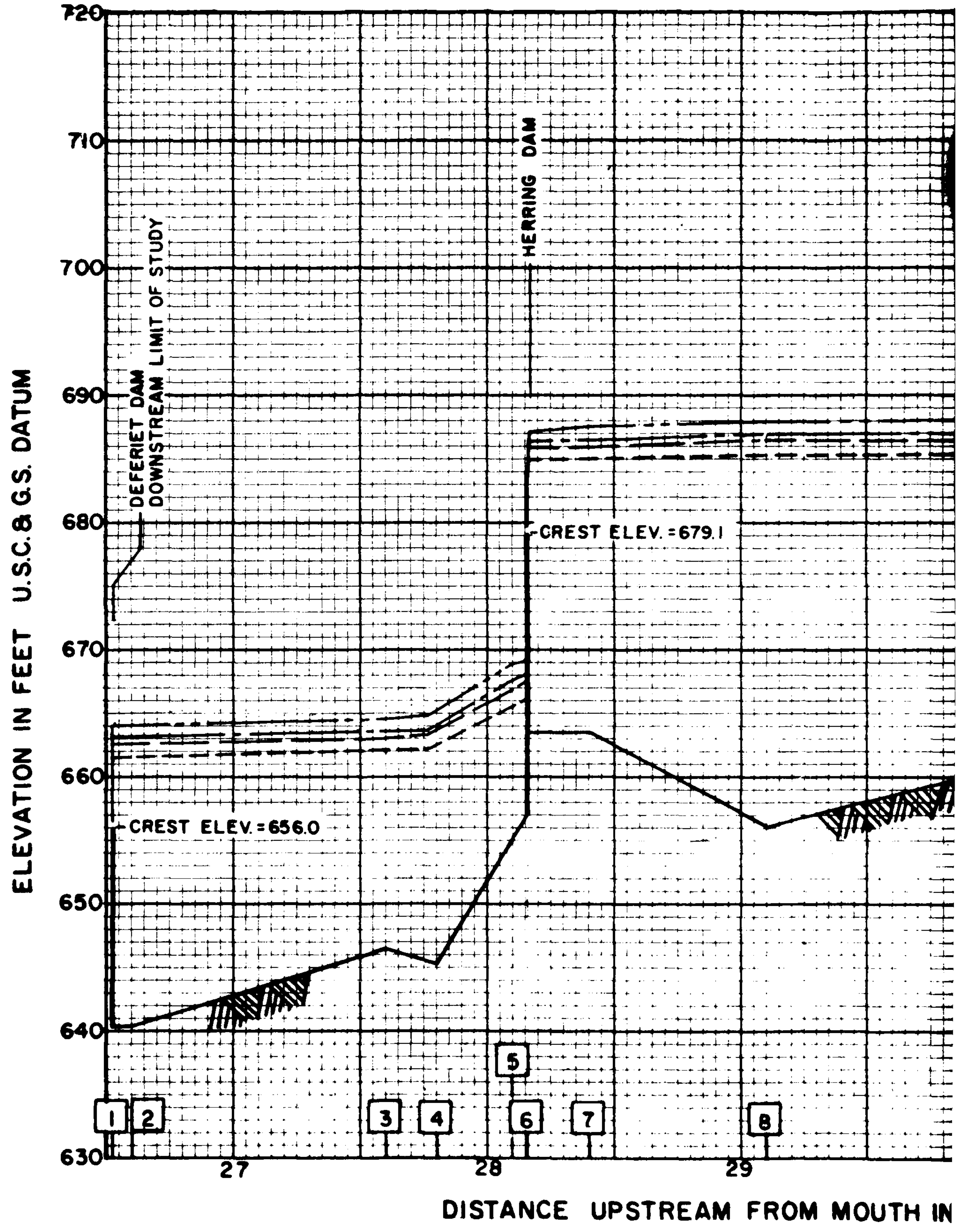
DEPARTMENT OF THE ARMY
BUFFALO DISTRICT, CORPS OF ENGINEERS
BUFFALO, NEW YORK

FLOOD PLAIN INFORMATION
BLACK RIVER, NEW YORK
DEFERIET DAM TO
CONFLUENCE DEER RIVER

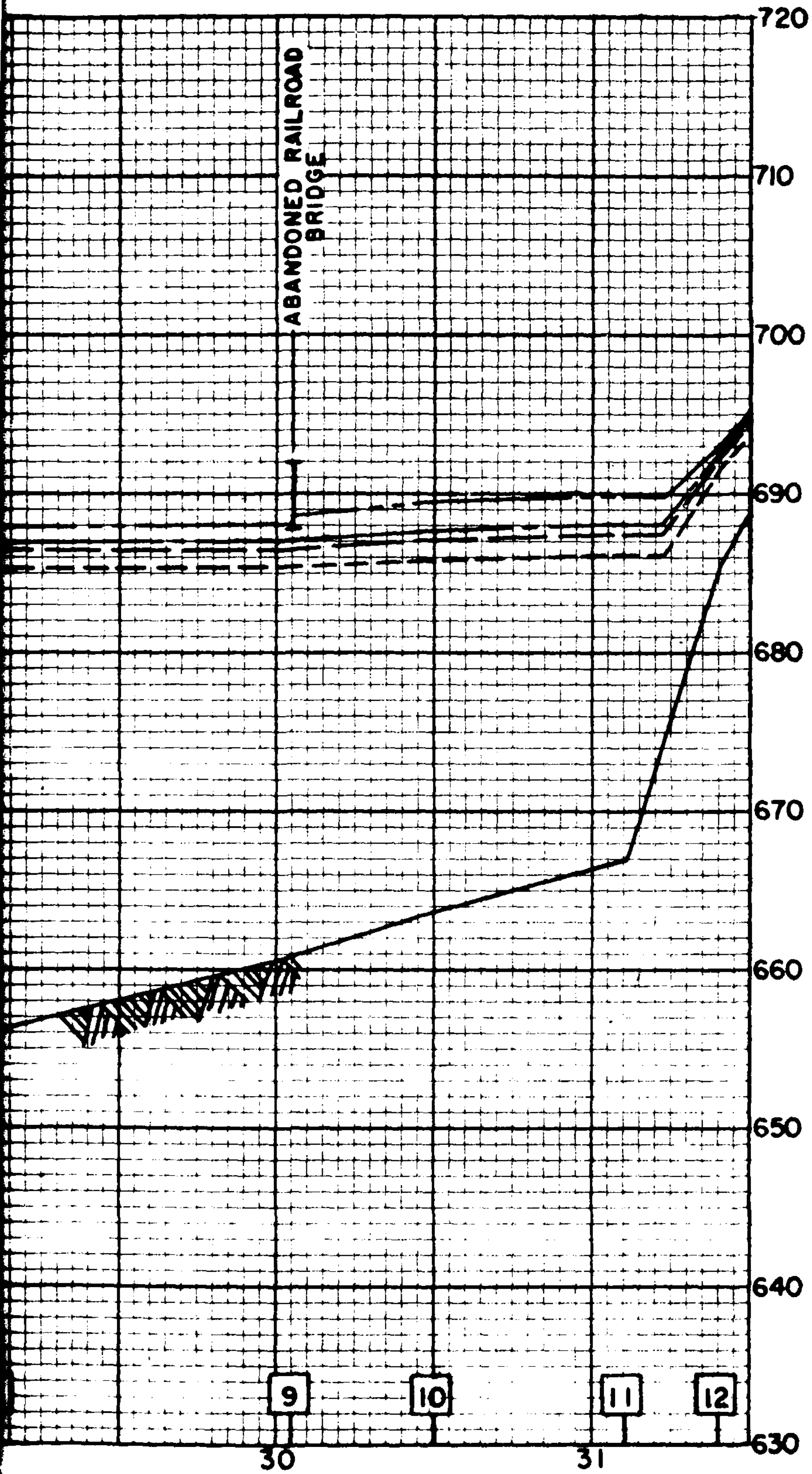
FLOODED AREAS

NOVEMBER 1977

PLATE 6



ELEVATION IN FEET U.S.C.& G.S. DATUM
720
710
700
690
680
670
660
650
640
630
DEFERIET DAM
DOWNSTREAM LIMIT OF STUDY
HERRING DAM
CREST ELEV. = 679.1
CREST ELEV. = 656.0
1
2
3
4
5
6
7
8
27
28
29
DISTANCE UPSTREAM FROM MOUTH IN



OM MOUTH IN MILES

LEGEND:

500 YEAR FLOOD

100 YEAR FLOOD

50 YEAR FLOOD

10 YEAR FLOOD

APPROXIMATE BRIDGE FLOOR

APPROXIMATE LOW STEEL

APPROXIMATE STREAM BED

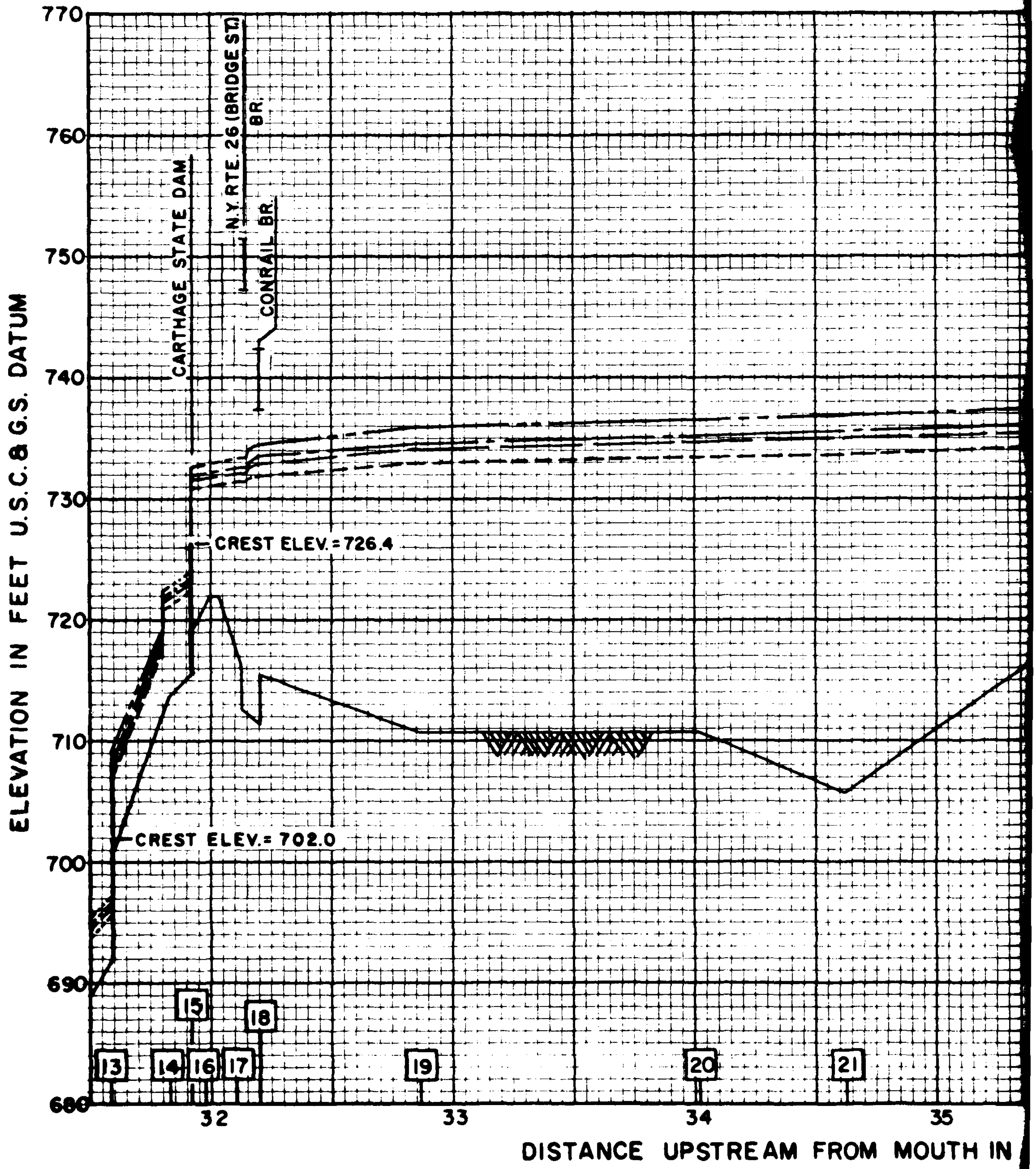
2 CROSS SECTION

DEPARTMENT OF THE ARMY
BUFFALO DISTRICT, CORPS OF ENGINEERS
BUFFALO, NEW YORK

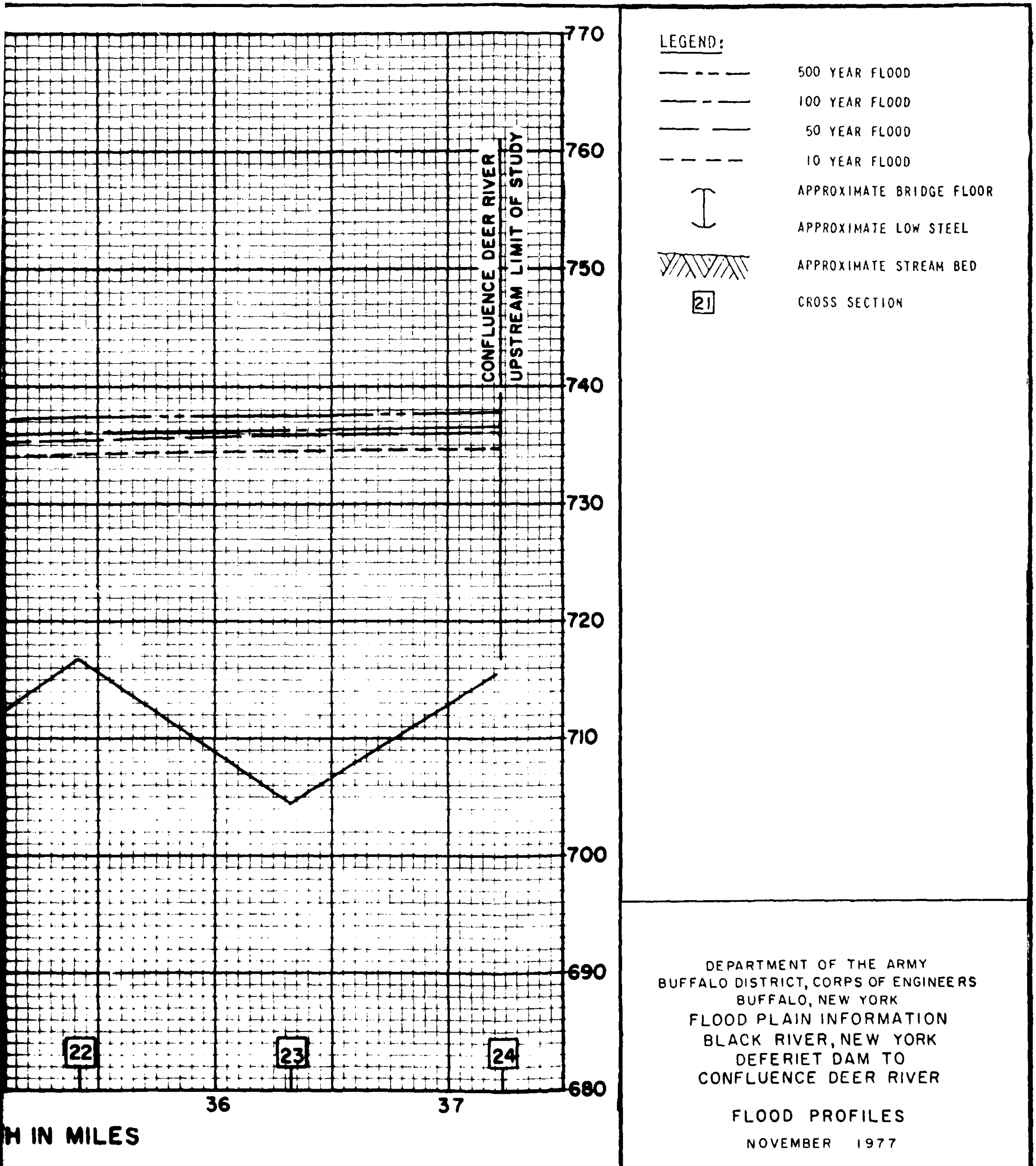
FLOOD PLAIN INFORMATION
BLACK RIVER, NEW YORK
DEFERIET DAM TO
CONFLUENCE DEER RIVER

FLOOD PROFILES
NOVEMBER 1977

PLATE 7



ELEVATION IN FEET U.S.C.& G.S. DATUM
770
760
750
740
730
720
710
700
690
680
CARTHAGE STATE DAM
N.Y. RTE. 26 (BRIDGE ST.) BR.
CONRAIL BR.
CREST ELEV. = 726.4
CREST ELEV. = 702.0
13
14
15
16
17
18
19
20
21
32
33
34
35
DISTANCE UPSTREAM FROM MOUTH IN



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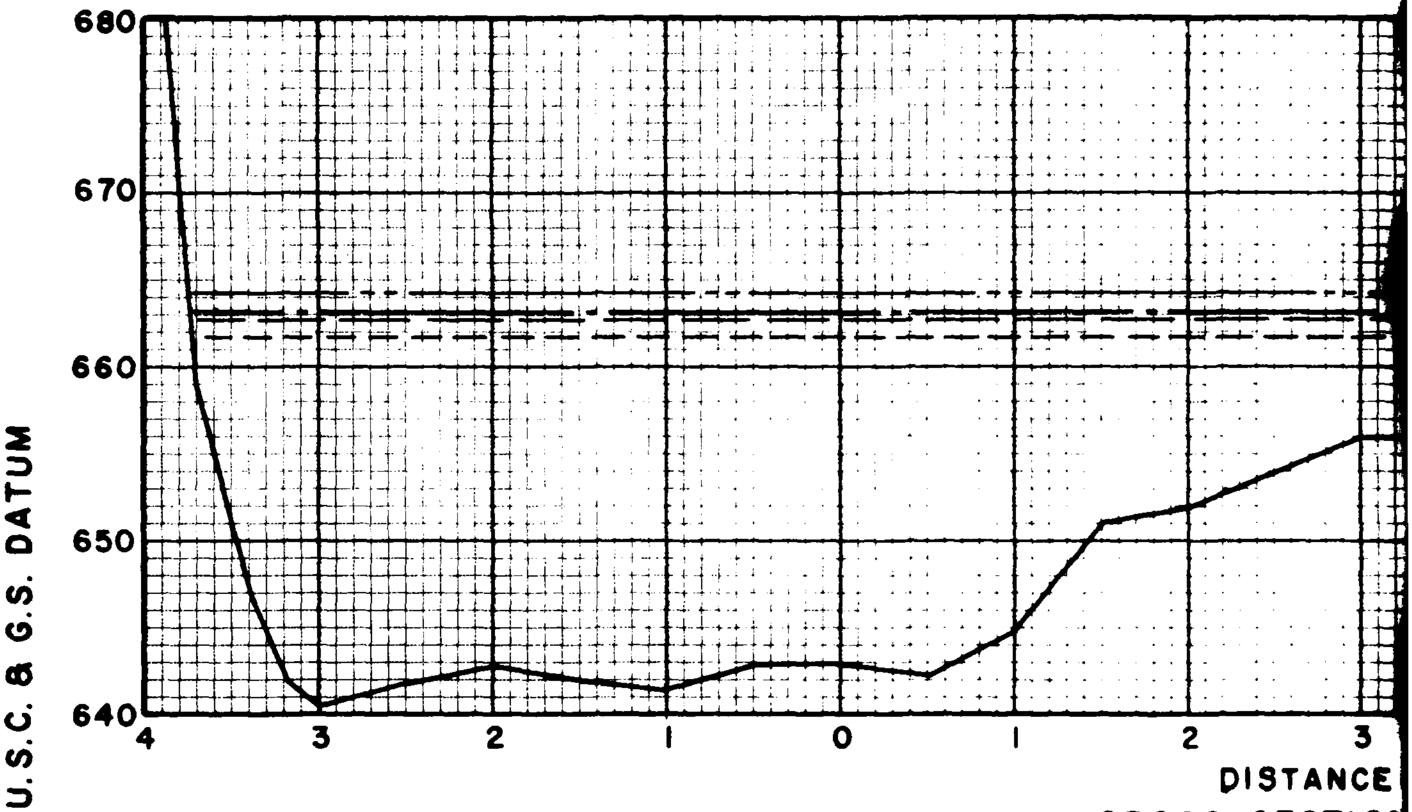
BUFFALO DISTRICT, CORPS OF ENGINEERS
BUFFALO, NEW YORK

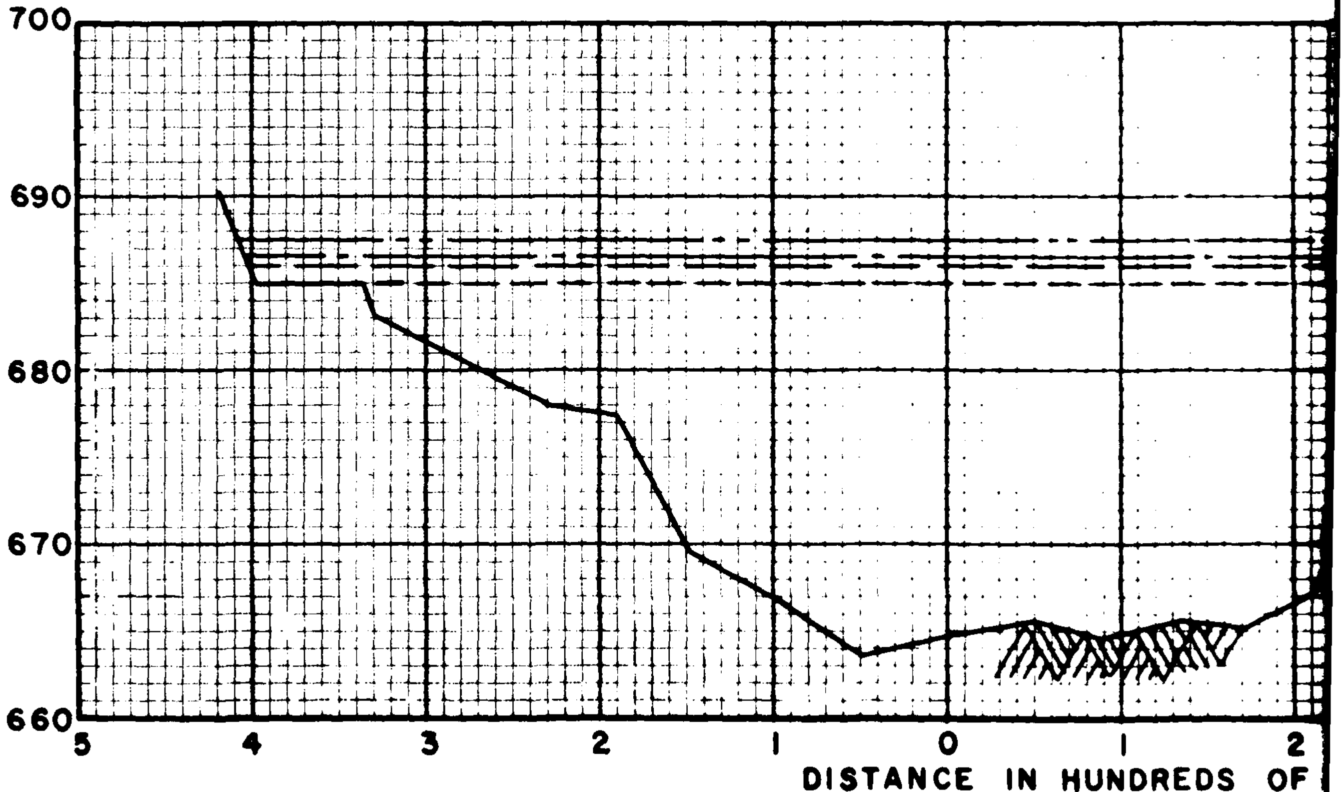
FLOOD PLAIN INFORMATION
BLACK RIVER, NEW YORK
DEFERIET DAM TO
CONFLUENCE DEER RIVER

FLOOD PROFILES

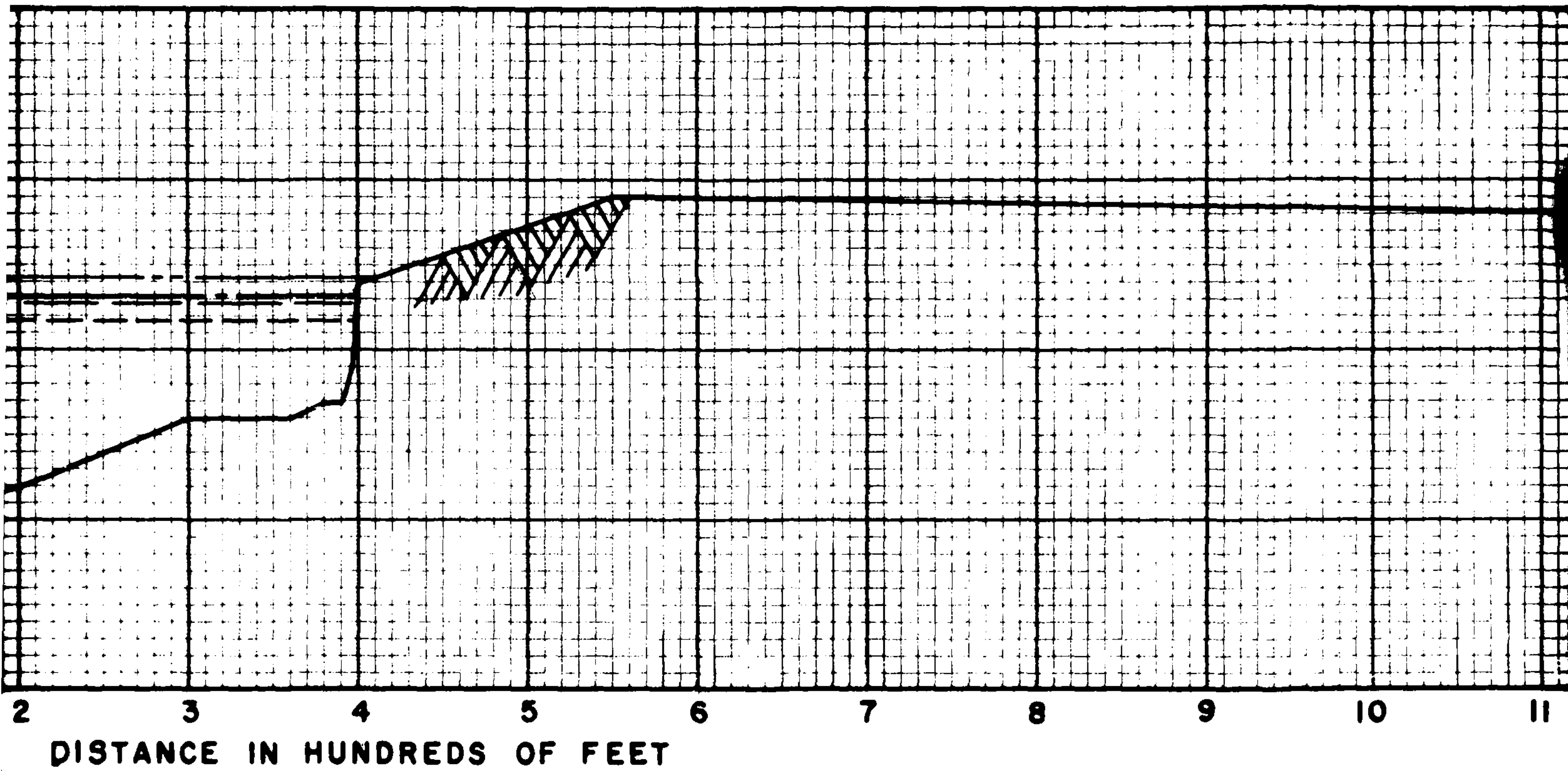
NOVEMBER 1977



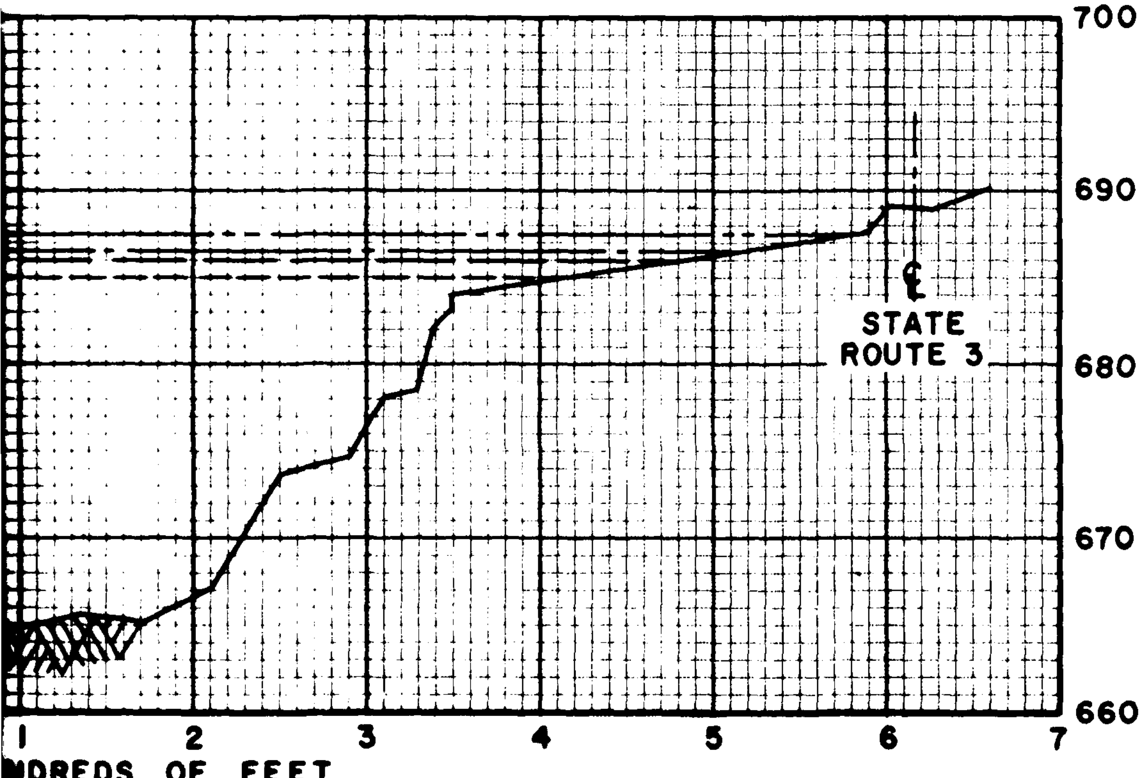
CROSS SECTIO



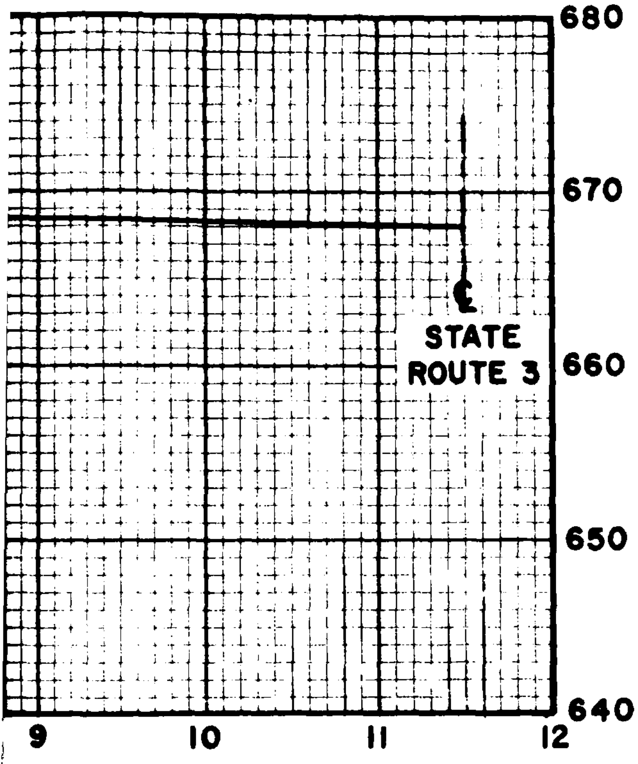
CROSS SECTION 7



SS SECTION 2 MILE 26.6



MILE 28.4



LEGEND:

500 YEAR FLOOD

100 YEAR FLOOD

50 YEAR FLOOD

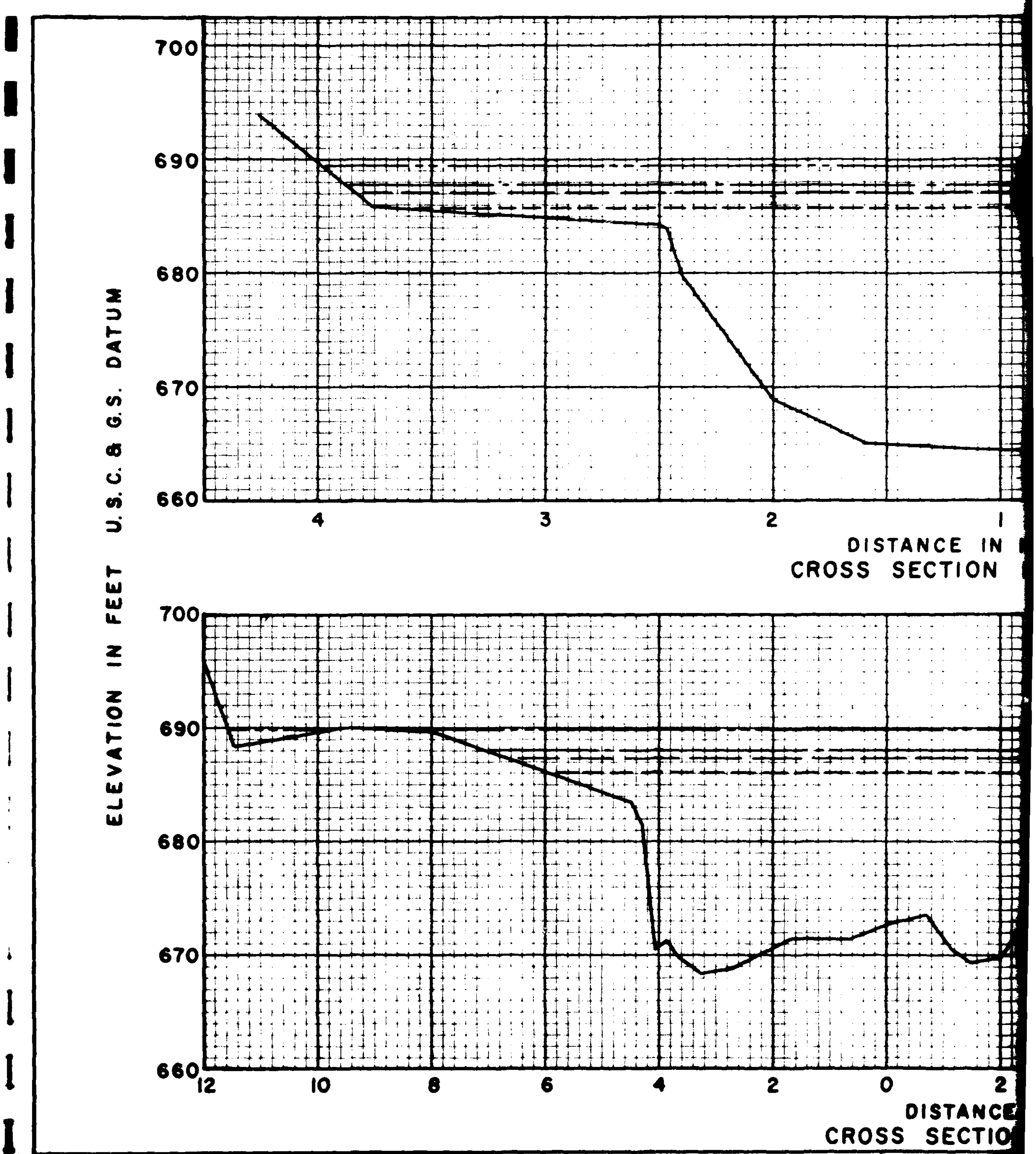
10 YEAR FLOOD

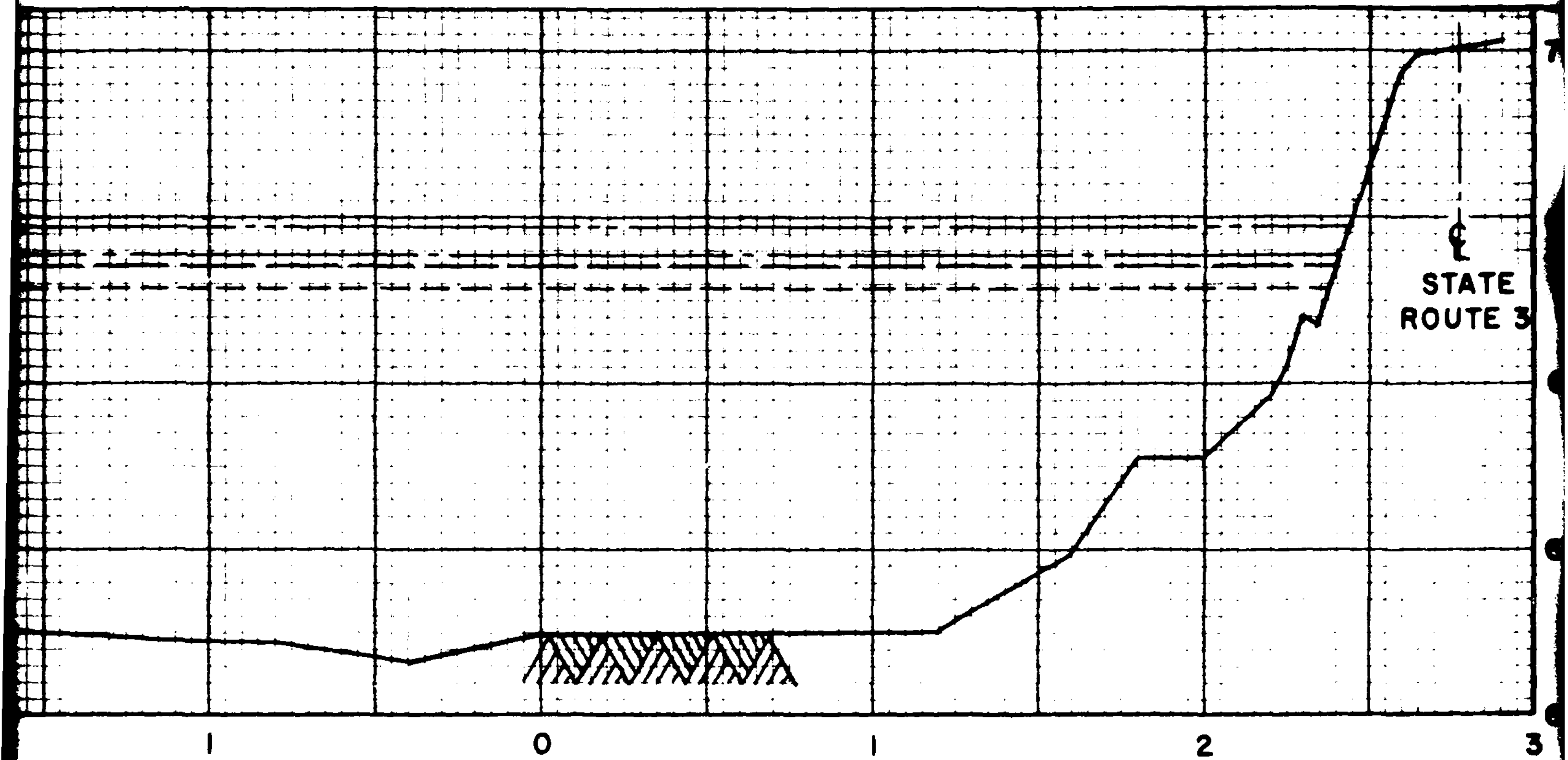
APPROXIMATE GROUND SURFACE

DEPARTMENT OF THE ARMY
BUFFALO DISTRICT, CORPS OF ENGINEERS
BUFFALO, NEW YORK

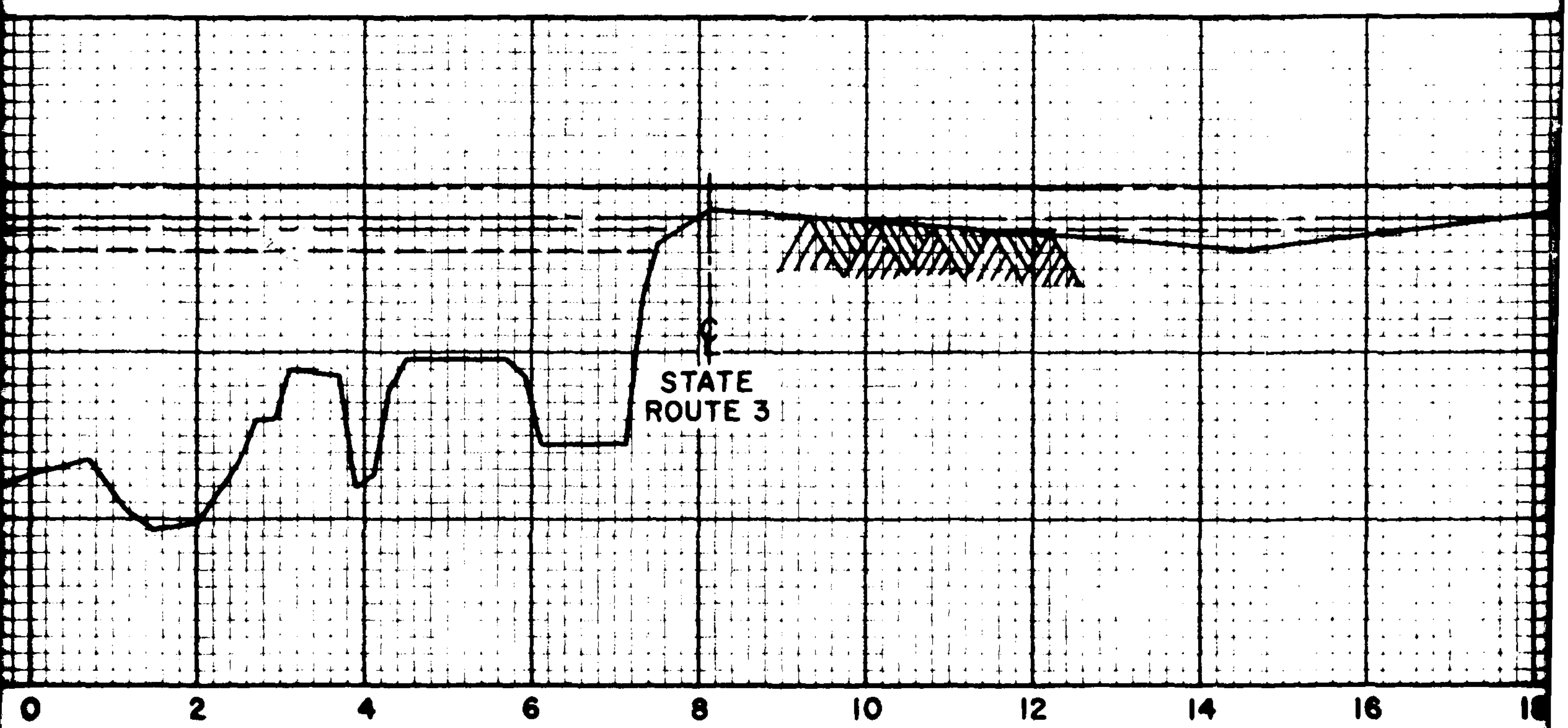
FLOOD PLAIN INFORMATION
BLACK RIVER, NEW YORK
DEFERIET DAM TO
CONFLUENCE DEER RIVER

VALLEY CROSS SECTIONS
NOVEMBER 1977

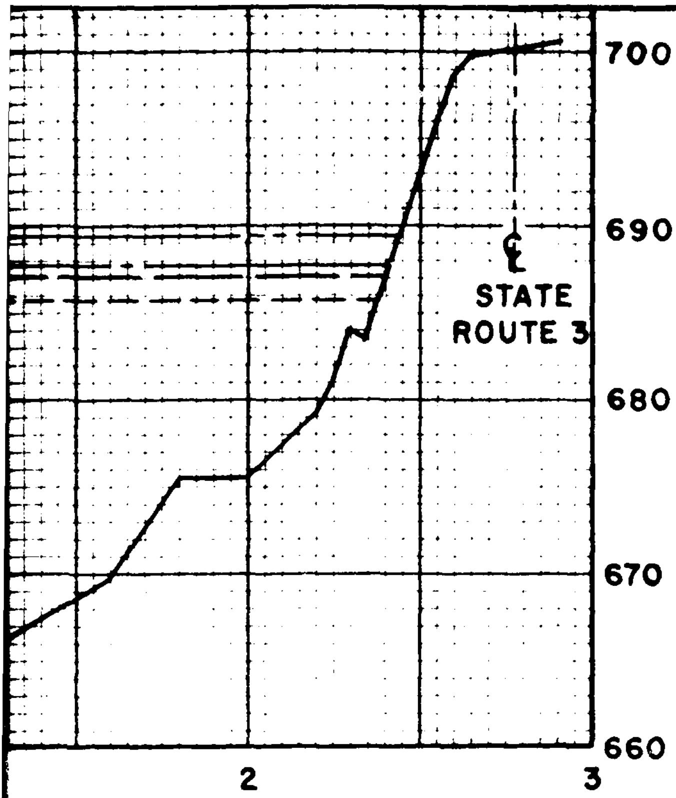

ELEVATION IN FEET U.S.C.& G.S. DATUM
700
690
680
670
660
4
3
2
1
DISTANCE IN
CROSS SECTION
700
690
680
670
660
12
10
8
6
4
2
0
2
DISTANCE
CROSS SECTIO

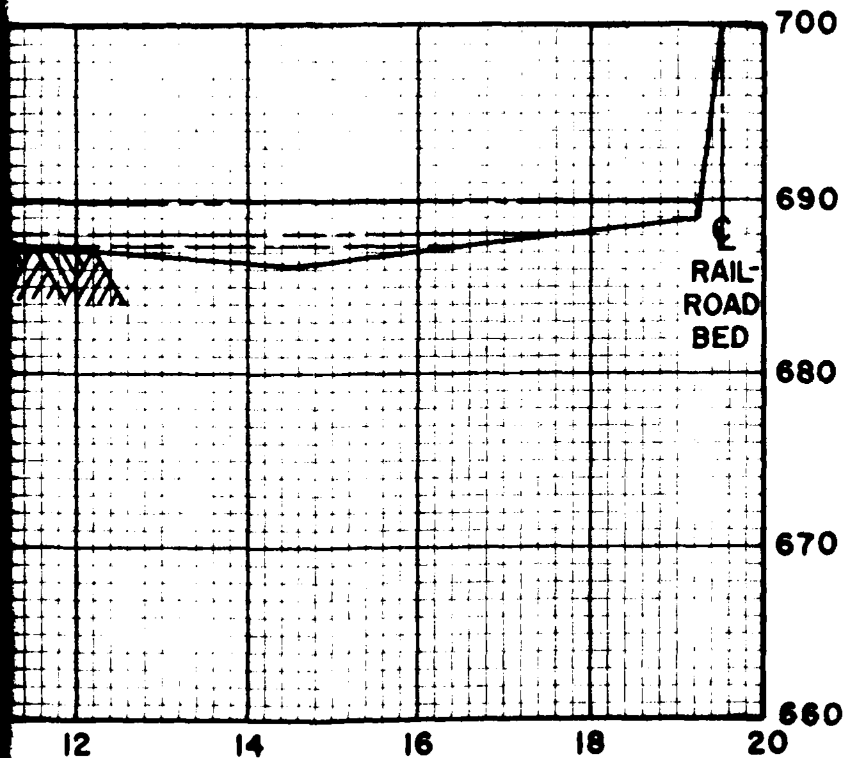


STANCE IN HUNDREDS OF FEET
SECTION 10 MILE 30.5



DISTANCE I.' HUNDREDS OF FEET
SS SECTION 11 MILE 31.1





LEGEND:

500 YEAR FLOOD

100 YEAR FLOOD

50 YEAR FLOOD

10 YEAR FLOOD

APPROXIMATE GROUND SURFACE

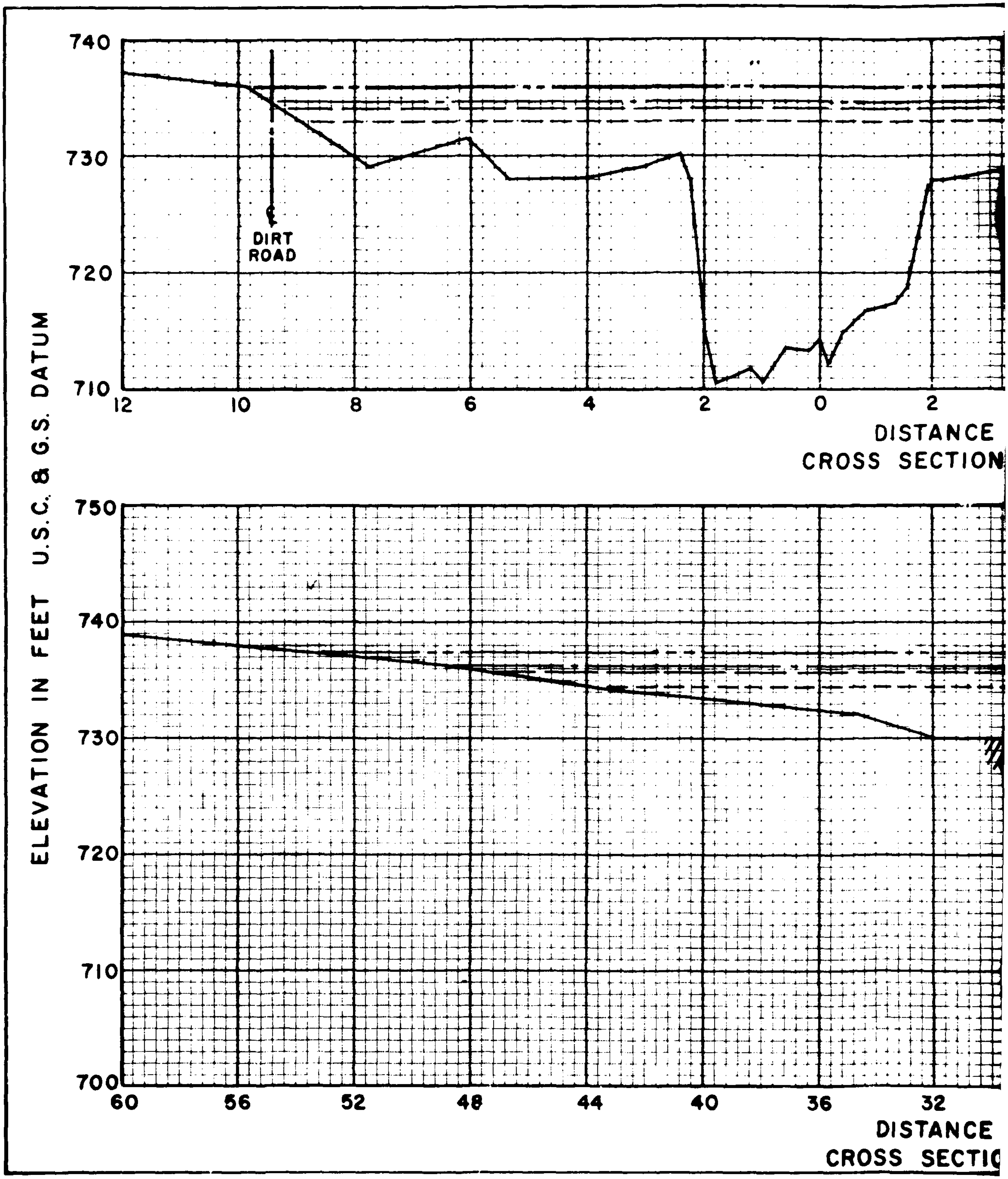
DEPARTMENT OF THE ARMY
BUFFALO DISTRICT, CORPS OF ENGINEERS
BUFFALO, NEW YORK

FLOOD PLAIN INFORMATION
BLACK RIVER, NEW YORK
DEFERIET DAM TO
CONFLUENCE DEER RIVER

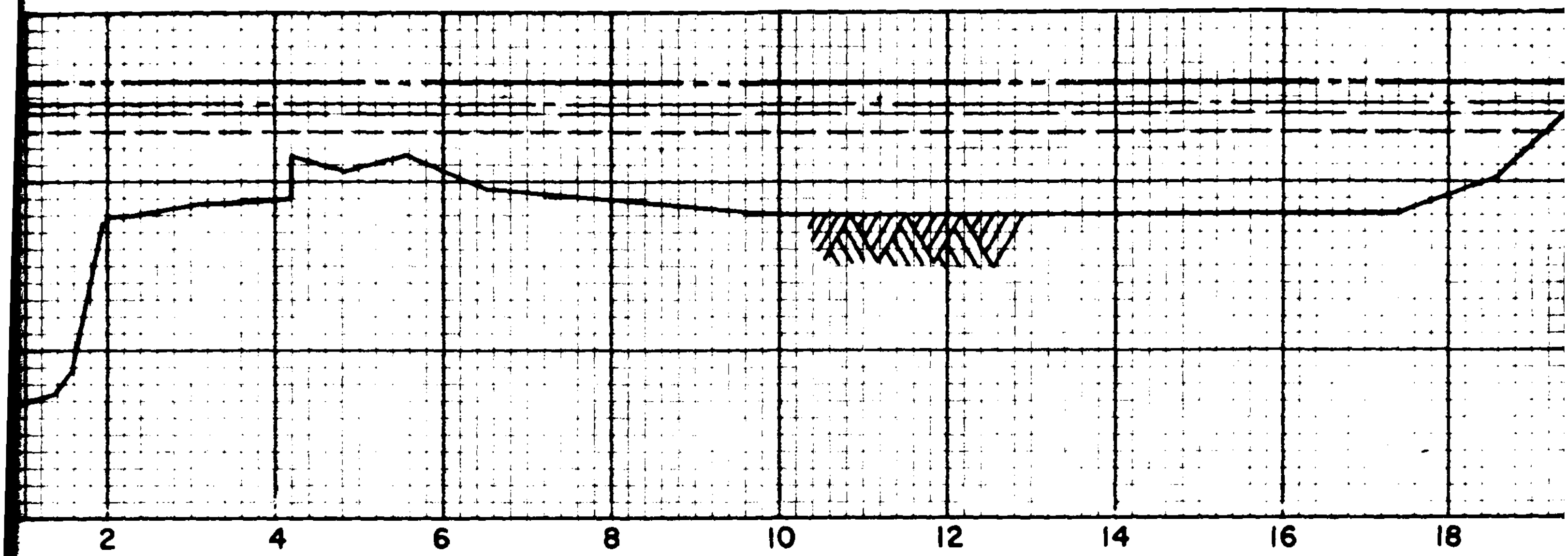
VALLEY CROSS SECTIONS

NOVEMBER 1977

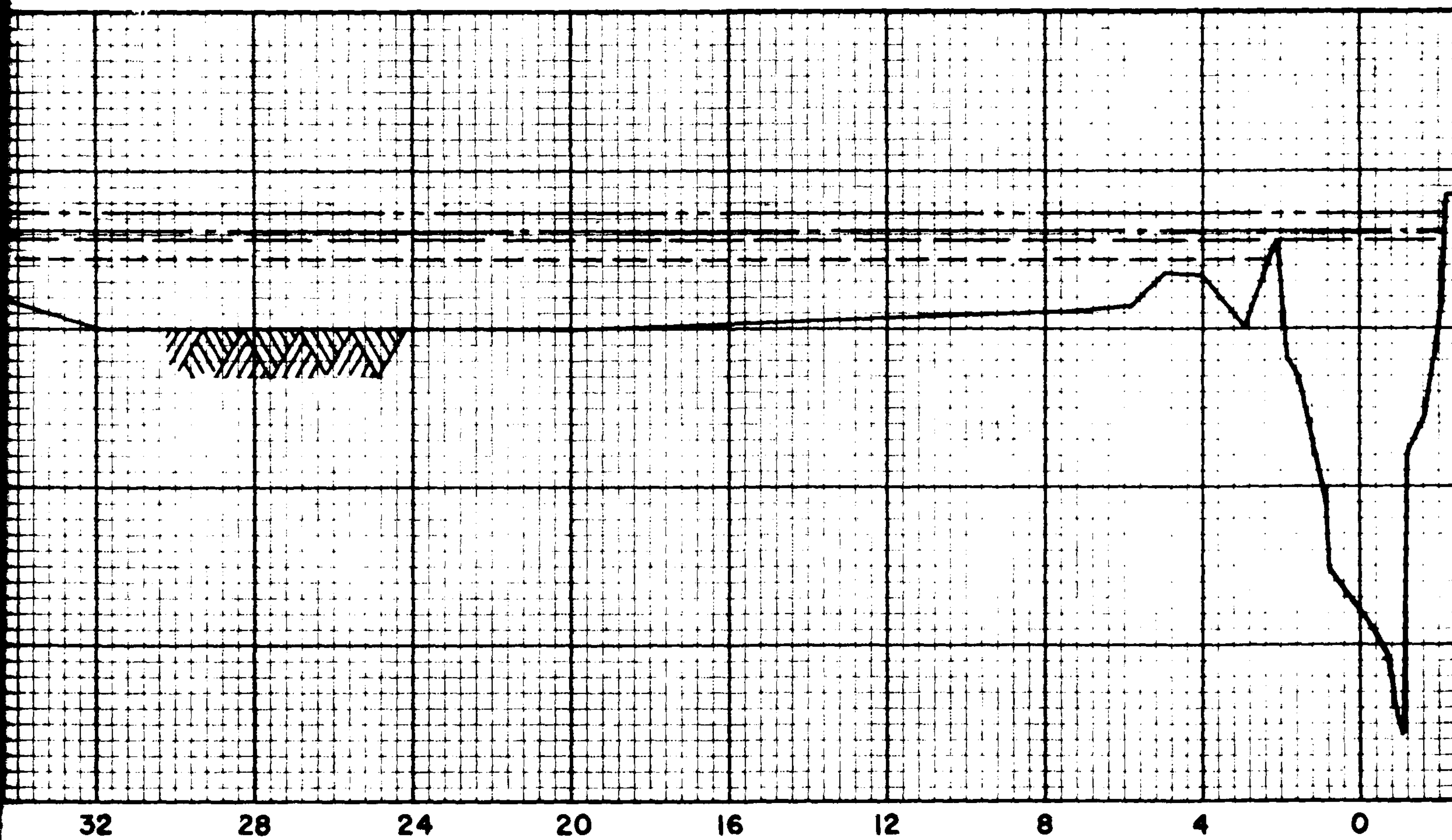
PLATE 10



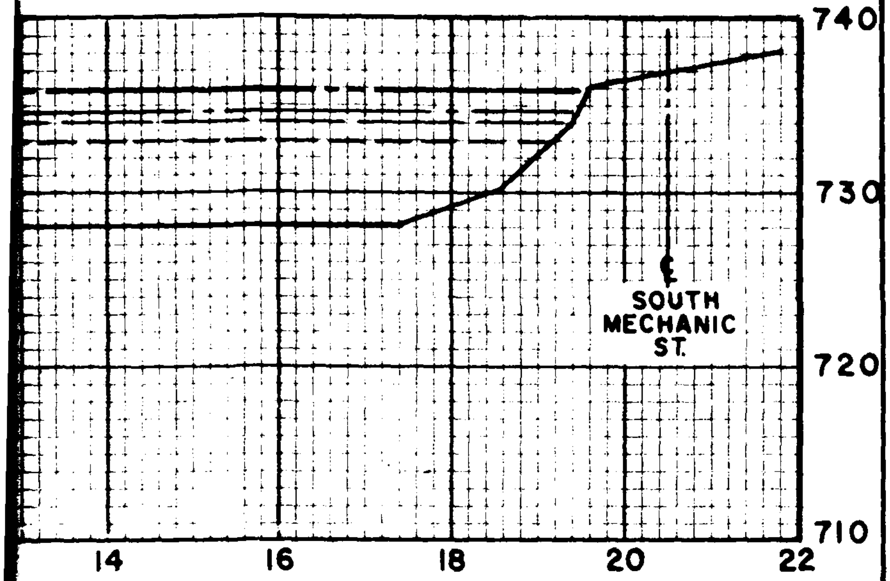
ELEVATION IN FEET U.S.C. & G.S. DATUM
740
730
720
710
DIRT ROAD
12
10
8
6
4
2
0
2
DISTANCE
CROSS SECTION
750
740
730
720
710
700
60
56
52
48
44
40
36
32
DISTANCE
CROSS SECTIO

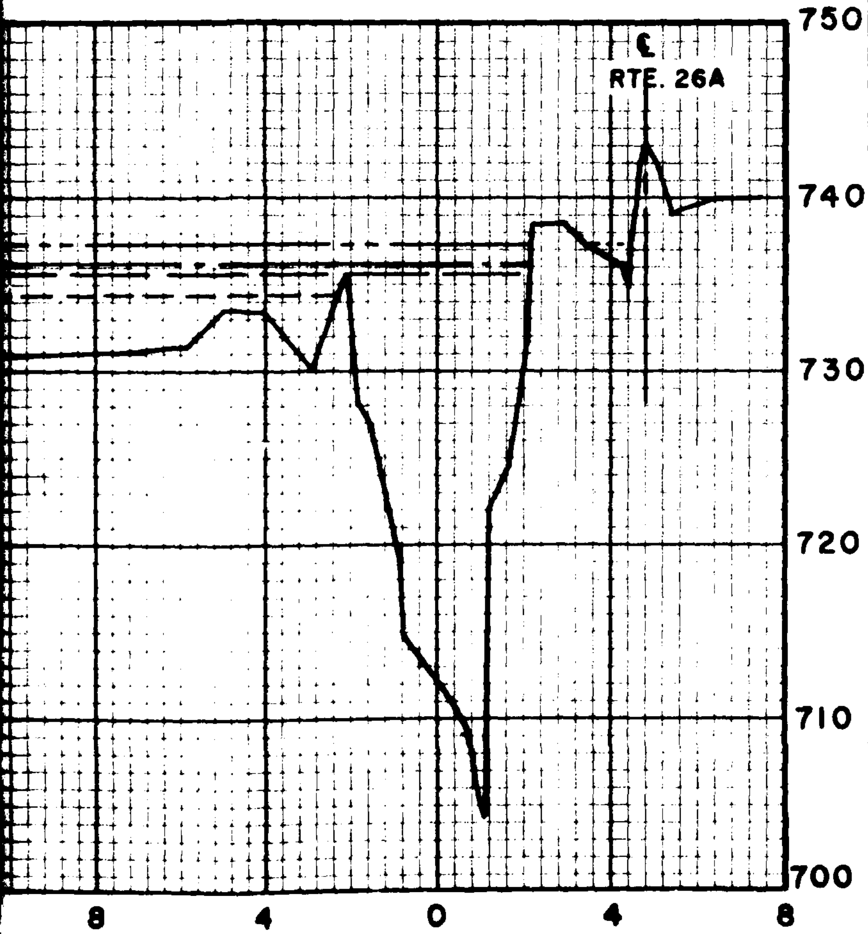


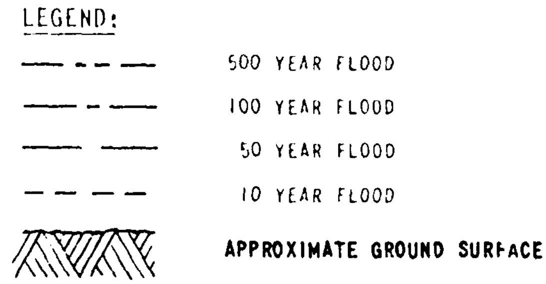
S SECTION 19 MILE 32.86



OSS SECTION 23 MILE 36.32







DEPARTMENT OF THE ARMY
BUFFALO DISTRICT, CORPS OF ENGINEERS
BUFFALO, NEW YORK

FLOOD PLAIN INFORMATION
BLACK RIVER, NEW YORK
DEFERIET DAM TO
CONFLUENCE DEER RIVER

VALLEY CROSS SECTIONS

NOVEMBER 1977

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-8